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## A REFERENCE ATMOSPHERE FOR PATRICK AFB, FLORIDA, ANNUAL (1963 REVISION)

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Huntsville, Alabama*

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A REFERENCE ATMOSPHERE FOR PATRICK AFB, FLORIDA, ANNUAL  
(1963 REVISION)

[ A REFERENCE ATMOSPHERE FOR CAPE KENNEDY, FLORIDA  
DEFINED TO 90 Km ALTITUDE  
EXTENDED TO 700 Km ALTITUDE ]

By

O. E. Smith and Don K. Weidner<sup>1</sup>

George C. Marshall Space Flight Center

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ABSTRACT

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The reference atmosphere established by this study is based on the most current annual statistical parameters of pressure-height, temperature, and relative humidity for the constant pressure levels from 0 to 28 km altitude and on a defined temperature versus altitude relationship from 28 to 90 km altitude. It is also extended to 700 km altitude by the technique given in the U. S. Standard Atmosphere, 1962 with latitude adjustments so that it is directly applicable to Cape Kennedy. This technique was refined by simplification of the expression for geopotential height. Computed values of pressure, kinetic temperature, virtual temperature, molecular temperature, density, coefficient of viscosity, kinematic viscosity, speed of sound, molecular weight, pressure ratio, density ratio, viscosity ratio, and pressure difference are tabulated from 0 to 700 km altitude.

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NASA - GEORGE C. MARSHALL SPACE FLIGHT CENTER

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# LIST OF SYMBOLS AND ABBREVIATIONS

## Symbol

$C_S$	Speed of sound ( $\text{m sec}^{-1}$ )
$g$	Acceleration of gravity ( $\text{m sec}^{-2}$ )
$g_0$	Acceleration of gravity at sea-level ( $9.80665 \text{ m sec}^{-2}$ )
$L_k$	Kinetic temperature gradient $dT/dZ$ ( $^{\circ}\text{K m}^{-1}$ )
$L_m$	Molecular temperature gradient $dT_m/dZ$ ( $^{\circ}\text{K m}^{-1}$ )
$M$	Molecular weight of air (unitless)
$M_0$	Molecular weight of air from 0 to 90 km altitude (28.9644)
$P$	Pressure (newtons $\text{cm}^{-2}$ )
$P_0$	Sea-level pressure at Cape Kennedy ( $10.1701472 \text{ newtons cm}^{-2}$ )
$PR$	Pressure ratio (percent)
$PD$	Pressure difference (newtons $\text{cm}^{-2}$ )
$R^*$	Universal gas constant [ $8.31436 \times 10^3 \text{ m}^2 \text{ sec}^{-2} (^{\circ}\text{K})^{-1}$ ]
$r' = 6335596$	Function of latitude used to convert geopotential height to geometric altitude
$r^* = 6344860$	Function of latitude used to convert geopotential height to geometric altitude
$S$	Sutherland's constant ( $110.4 ^{\circ}\text{K}$ )
$T$	Kinetic temperature ( $^{\circ}\text{K}$ )
$T^*$	Virtual temperature ( $^{\circ}\text{K}$ )
$T_m$	Molecular temperature ( $^{\circ}\text{K}$ )
$Z$	Geometric altitude (m)
$\Phi$	Geopotential height ( $\text{m}^2 \text{ sec}^{-2}$ )



# LIST OF SYMBOLS AND ABBREVIATIONS (cont)

## Symbol

$\varphi$	Latitude (degrees)
$\rho$	Density ( $\text{kg m}^{-3}$ )
$\rho_R$	Density ratio (percent)
$\rho_0$	Sea level density at Cape Kennedy ( $1.18354674 \text{ kg m}^{-3}$ )
$\beta$	Constant used in Sutherland's viscosity equation [ $1.458 \times 10^{-8} \text{ kg sec}^{-1} \text{ m}^{-1} (\text{°K})^{-\frac{1}{2}}$ ]
$\mu$	Coefficient of viscosity (newtons sec $\text{m}^{-2}$ )
$\mu_0$	Sea level coefficient of viscosity at Cape Kennedy ( $1.8302431 \times 10^{-5}$ newtons sec $\text{m}^{-2}$ )
$\eta$	Kinematic viscosity ( $\text{m}^2 \text{ sec}^{-1}$ )
$\gamma$	Ratio of specific heat (1.40 unitless)
USS-62	U. S. Standard Atmosphere, 1962
KRA-63	A Reference Atmosphere for Cape Kennedy, Florida (defined to 90 Km and extended to 700 Km altitude)
mb	Millibar ( $\text{mb} = 10^{-2}$ newtons $\text{cm}^{-2}$ )
$^{\circ}\text{K}$	Degrees Kelvin ( $^{\circ}\text{K} = \text{degrees Celcius} + 273.15^{\circ}$ )

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[ A REFERENCE ATMOSPHERE FOR CAPE KENNEDY, FLORIDA  
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### SUMMARY

The reference atmosphere established by this study is based on the most current annual statistical parameters of pressure-height, temperature, and relative humidity for the constant pressure levels from 0 to 28 km altitude and on a defined temperature versus altitude relationship from 28 to 90 km altitude. It is also extended to 700 km altitude by the technique given in the U. S. Standard Atmosphere, 1962 with latitude adjustments so that it is directly applicable to Cape Kennedy. This technique was refined by simplification of the expression for geopotential height. Computed values of pressure, kinetic temperature, virtual temperature, molecular temperature, density, coefficient of viscosity, kinematic viscosity, speed of sound, molecular weight, pressure ratio, density ratio, viscosity ratio, and pressure difference are tabulated from 0 to 700 km altitude.

### SECTION I. INTRODUCTION

The need for realistic atmospheric models derived from the best available information has been recognized. It is also imperative that models be revised or up-dated as better information becomes available.

In 1961, a reference atmosphere (TN D-595) [1] was developed for Patrick Air Force Base, Florida. It is based on annual median values of geopotential height, temperature, and relative humidity for the standard pressure levels from 0 to 28 km altitude, and is extended to 47 km altitude by use of extrapolated temperature versus pressure values from the ARDC, 1959 Model Atmosphere.

Improvements in accuracy and frequency of atmospheric measurements have rapidly advanced knowledge of the structure of the atmosphere and have led to the publication of the U. S. Standard Atmosphere, 1962 [2] and the Atlantic Missile Range Atmosphere for Cape Kennedy, Florida (IRIG

104-63) [3]. The atmosphere defined by the IRIG Reference Atmosphere for Cape Kennedy is also based on median values of thermodynamic quantities for the standard pressure levels (see Table I). These median values differ slightly from those used in TN D-595 because they are based on a larger number of observations. However, a rigid comparison shows the respective computed quantities that define these two atmospheres to have maximum relative differences of 0.07 percent in temperatures, 0.5 percent in pressures, and 0.4 percent in densities, and an average relative difference of only 0.3 percent.

Therefore, as the atmosphere defined by TN D-595 was revised by the IRIG Reference Atmosphere for Cape Kennedy, the purpose of this report is not to revise, but to extend the definition of the Reference Atmosphere for Patrick Air Force Base (Cape Kennedy), Florida. In this report, the reference atmosphere is defined to 90 km and extended to 700 km.

## SECTION II. DETERMINATION OF A REFERENCE ATMOSPHERE FOR CAPE KENNEDY, FLORIDA

### A. DEFINITION

The reference atmosphere established by this report is defined by computed values of pressure, kinetic temperature, virtual temperature, molecular temperature, density, coefficient of viscosity, kinematic viscosity, speed of sound, molecular weight, pressure ratio, density ratio, viscosity ratio, and pressure difference. In general, these parameters are tabulated for each 250-meter interval from 0 to 90 km altitude, each 1,000-meter interval from 90 to 300 km altitude, and each 2,000-meter interval from 300 to 700 km altitude. However, kinematic viscosity and kinetic temperature are computed from 0 to 90 km altitude only, virtual temperature becomes the same as kinetic temperature above the moisture layer (10,832.1 meters altitude), and molecular temperature is computed from 90 to 700 km altitude only.

### B. PROCEDURE

1. Basic Data. The median values of various thermodynamic parameters, which were used as basic data in the IRIG Reference Atmosphere for Cape Kennedy, are presented in Table I. These are also the basic data used in deriving the atmosphere defined by this report for the altitude region from 0 to 28 km. The median values of geopotential height, density, and temperature were computed from frequency distributions of each parameter for the standard pressure levels. Relative

humidity median values were determined from the cumulative frequency corresponding to the class interval in which the median temperature occurred.

Data for the altitude region from 28,000 to 83,004 meters are based on a defined temperature versus altitude relationship. Pressure data are obtained by first fitting a fifth degree empirical polynomial to the temperature versus geometric altitude curve and then performing the following step-wise integration procedure.

$$P_i = (P_{i-1}) \exp \frac{-g_0 M_0 \Delta \phi}{R^* T'} \quad (1)$$

where

$\Delta \phi = (\phi_i - \phi_{i-1})$  = an increment of geopotential height

$$T = A_0 + A_1 Z + A_2 Z^2 + A_3 Z^3 + A_4 Z^4 + A_5 Z^5 \quad (2)$$

$$T' = \frac{T_i + T_{i-1}}{2}$$

(The derived coefficients  $A_0 \dots A_5$  are listed in Table II, legs 4 and 5.)

If  $g_\varphi$  is the actual acceleration of gravity at mean sea level at the given latitude  $\varphi$ , the geopotential height  $\phi$  may be computed as follows [4]:

$$\phi = \frac{Z r'}{Z + r'} \quad (3)$$

where

$$r^* = \frac{2g_\varphi}{-\left(\frac{\partial g}{\partial Z}\right)_{Z=0}} \quad ,$$

$$-\left(\frac{\partial g}{\partial z}\right)_{z=0} = 3.085462 \times 10^{-6} + 2.27 \times 10^{-9} \cos 2\varphi \\ - 2 \times 10^{-12} \cos 4\varphi ,$$

and

$$r' = \frac{g_{\varphi} r^*}{9.8} .$$

A relationship of pressure versus geometric altitude is now defined for the altitude region from 28,000 to 83,004 meters.

For the altitude region from 83,004 to 90,000 meters, basic data for this report are taken from the U. S. Standard Atmosphere, 1962. The isothermal nature of this portion of the atmosphere facilitates a convenient place for the integration of data from the U. S. Standard Atmosphere, 1962. Computations are made more representative of Cape Kennedy by recalculating the geometric altitude from the geopotential height using the exact latitude.

The atmosphere defined by this report is extended from 90 to 700 km altitude by the technique given in the U. S. Standard Atmosphere, 1962 with latitude adjustments so that it is directly applicable to Cape Kennedy, Florida. This technique was refined by simplification of the expression for geopotential height.

2. Empirical Polynomials. The atmospheric parameters of pressure, virtual temperature, and kinetic temperature are computed by use of empirical polynomials from 0 to 83,004 meters altitude. The density is also computed in this manner from 0 to 28,000 meters. These empirical polynomials are formed by least square fits to the respective parameter versus altitude curves. In performing the curve fits, each curve is broken into five legs and coefficients are derived. Therefore, these derived coefficients, as listed in Table II, are neither the same from equation to equation nor from leg to leg. The empirical curve fits are in agreement with the median values presented in Table I and generally display analytical continuity in the first and second derivatives. The second derivative, however, has discontinuities in the neighborhood of the end point of each leg.

3. Derived Thermodynamic Quantities. The following section is given to explain the final computation of thermodynamic quantities listed in Table III. Analytical equations are also presented when applicable. Derived values of the coefficients ( $A_0 . . . . A_5$ ) are given in Table II.

a. Pressure

(1) Altitude Region: 0 to 28,000 meters

$$P = P_1 \exp (A_0 + A_1 Z + A_2 Z^2 + A_3 Z^3 + A_4 Z^4 + A_5 Z^5) \quad (4)$$

where

$$P_1 = 10.0 \text{ newtons cm}^{-2}.$$

(2) Altitude Region: 28,000 to 83,004 meters

$$P = g_0 \times 10^{-4} [\exp (A_0 + A_1 Z + A_2 Z^2 + A_3 Z^3 + A_4 Z^4 + A_5 Z^5)]. \quad (5)$$

(3) Altitude Region: 83,004 to 90,000 meters

(a) Analytical Equation

$$P = P_b \exp \left[ \frac{g_0 M_0 r' r^* (Z - Z_b)}{R^* T_b (r^* + Z) (r^* + Z_b)} \right] \quad (6)$$

(b) Computational Equation

$$P = P_b \exp \left[ \frac{-1.373301523 \times 10^{12} (Z - Z_b)}{T_b (6344860 + Z) (6344860 + Z_b)} \right] \quad (7)$$

where

$P_b$  = Pressure at base

$T_b$  = Kinetic temperature at base

$Z_b$  = Geometric altitude at base.

(4) Altitude Region: 90,000 to 700,000 meters

(a) Analytical Equation for  $L_m \neq 0$

$$\ln P = \ln P_b + \left[ \frac{g_0 M_0 r' r^*}{L_m R^* (r^* + Z) (r^* + Z_b)} \right] \ln \left[ \frac{T_{mb}}{T_{mb} + L_m (Z - Z_b)} \right]. \quad (8)$$

(b) Computational Equation for  $L_m \neq 0$

$$\ln P = \ln P_b + \left[ \frac{1.373301523 \times 10^{12}}{L_m (6344860 + Z) (6344860 + Z_b)} \right] \ln \left[ \frac{T_{mb}}{T_{mb} + L_m (Z - Z_b)} \right], \quad (9)$$

where

$T_{mb}$  = Molecular temperature at base.

If

$L_m = 0$ ,

the analytical equation is the same as Equation (6) and the computational equation is the same as Equation (7). In this altitude region, however, molecular temperature ( $T_{mb}$ ) is used instead of kinetic temperature ( $T_b$ ).

#### b. Density

(1) Altitude Region: 0 to 28,000 meters

$$\rho = \rho_1 \exp (A_0 + A_1 Z + A_2 Z^2 + A_3 Z^3 + A_4 Z^4 + A_5 Z^5), \quad (10)$$

where

$\rho_1$  = Density at the 1000 mb level ( $1.16790729 \text{ kg m}^{-3}$ ).

(2) Altitude Region: 28,000 to 700,000 meters

(a) Analytical Equation

$$\rho = \frac{10^4 M_0 P}{R^* T_n} \quad (11)$$

(b) Computational Equation

$$\rho = (0.3483676 \times 10^2) \frac{P}{T_n} \quad (12)$$

where

$T_n = T$  from 28,000 to 90,000 meters altitude

$T_n = T_m$  from 90,000 to 700,000 meters altitude.

c. Density Ratio

(1) Altitude Region: 0 to 700,000 meters

$$\rho R = \frac{\rho}{\rho_0} \quad (13)$$

d. Pressure Ratio

(1) Altitude Region: 0 to 700,000 meters

$$PR = \frac{P}{P_0} \quad (14)$$

e. Virtual Temperature

(1) Altitude Region: 0 to 10,832.1 meters

$$T^* = A_0 + A_1 Z + A_2 Z^2 + A_3 Z^3 + A_4 Z^4 + A_5 Z^5. \quad (15)$$



Virtual temperature is the same as kinetic temperature above 10,832.1 meters altitude.

f. Kinetic Temperature

(1) Altitude Region: 0 to 83,004 meters

$$T = A_0 + A_1 Z + A_2 Z^2 + A_3 Z^3 + A_4 Z^4 + A_5 Z^5. \quad (16)$$

(2) Altitude Region: 83,004 to 90,000 meters

$$T = T_b + L_k (Z - Z_b), \quad (17)$$

where

$T_b$  = Kinetic temperature at base

(3) Altitude Region: 90,000 to 700,000 meters

$$T = \frac{M T_m}{M_0}. \quad (18)$$

g. Molecular Temperature

(1) Altitude Region: 0 to 90,000 meters

The molecular temperature is equal to the kinetic temperature in this altitude region, as the molecular weight is considered to be of the constant value  $M_0$ .

(2) Altitude Region: 90,000 to 700,000

$$T_m = T_{mb} + L_m (Z - Z_b), \quad (19)$$

where

$T_{mb}$  = Molecular temperature at base

$Z_b$  = Geometric height at base.

h. Coefficient of Viscosity

(1) Altitude Region: 0 to 700,000 meters

(a) Analytical Equation

$$\mu = \frac{S (T_n)^{3/2}}{T_n + S} \quad (20)$$

(b) Computational Equation

$$\mu = \frac{1.458 \times 10^{-8} (T_n)^{3/2}}{T_n + 110.4} \quad (21)$$

where

$T_n = T$  from 0 to 90,000 meters altitude

$T_n = T_m$  from 90,000 to 700,000 meters altitude.

i. Kinematic Viscosity

(1) Altitude Region: 0 to 90,000 meters

$$\eta = \frac{\mu}{\rho} \quad (22)$$

(2) Altitude Region: 90,000 to 700,000 meters  
Kinematic viscosity is not computed above 90,000 meters altitude.

j. Viscosity Ratio

(1) Altitude Region: 0 to 700,000 meters

$$\mu R = \frac{\mu}{\mu_0} \quad (23)$$

k. Speed of Sound

(1) Altitude Region: 0 to 700,000 meters

(a) Analytical Equation

$$C_S = \left[ \frac{\gamma R^* T_n}{M_0} \right]^{1/2} . \quad (24)$$

(b) Computational Equation

$$C_S = 20.046707 (T_n)^{1/2}, \quad (25)$$

where

$T_n = T^*$  from 0 to 10,832.1 meters altitude

$T_n = T$  from 10,832.1 to 90,000 meters altitude

$T_n = T_m$  from 90,000 to 700,000 meters altitude.

l. Pressure Difference

(1) Altitude Region: 0 to 700,000 meters

$$PD = P_0 - P . \quad (26)$$

m. Molecular Weight

(1) Altitude Region: 0 to 90,000 meters

Molecular weight is taken to be of constant value (28.9644) below 90,000 meters altitude.

(2) Altitude Region: 90,000 to 700,000 meters

$$M = M_b + \Delta M (Z - Z_b), \quad (27)$$

where

$M_b$  = Molecular weight at base

$\Delta M$  = Molecular weight gradient

$Z_b$  = Geometric altitude at base.

4. Computer Subroutine (PRA-63). The computer subroutine that was used in the development of this report is available in the subroutine files of the MSFC Computation Laboratory and has been designated as PRA-63. This subroutine contains the most current thermodynamic quantities and may be considered to be the best representation of the annual median atmospheric conditions at Cape Kennedy, Florida, from surface to 700 km altitude.

### SECTION III. U. S. STANDARD ATMOSPHERE, 1962 COMPARISON

#### A. COMPARISON OF TEMPERATURE PROFILES

The temperature profiles of the U. S. Standard Atmosphere, 1962 and the atmosphere defined in this report differ significantly (see Fig. 1). The Cape Kennedy temperature is warmer in the troposphere and colder in the stratosphere than is the U. S. Standard temperature. The maximum temperature at the mesopeak is about the same in both atmospheres, but the Cape Kennedy temperature is warmer in the lower half of the mesosphere and colder in the upper portion. These differences are due to the variance of the atmospheric temperature gradient with latitude.

#### B. ABSOLUTE DIFFERENCES

The absolute pressure, temperature, and density differences between the atmosphere defined by this report and the U. S. Standard Atmosphere, 1962 are illustrated in Figure 2. These differences are computed for each km altitude by the following equations:

$$\Delta T = T_R - T_S \quad (28)$$

$$\Delta P = P_R - P_S \quad (29)$$

$$\Delta \rho = \rho_R - \rho_S, \quad (30)$$

where the subscript "R" denotes parameters from the atmosphere defined by this report and "S" denotes parameters from the U. S. Standard Atmosphere, 1962.

The maximum pressure differences occur in the mid-troposphere (5 to 11 km altitude) in association with maximum temperature differences in this altitude region. The absolute differences in density are greatest near the surface and in the 13 to 15 km altitude region, but are at a minimum in the 7 to 10 km altitude region. The latter altitude region is referred to as "the level of constant density" [5].

### C. RELATIVE COMPARISON

Due to the large variance in the magnitude of density and pressure, it is more informative to make relative comparisons instead of absolute comparisons. The relative differences between temperature, pressure, and density values from the atmosphere defined by this report and the U. S. Standard Atmosphere, 1962 are computed as follows:

$$\Delta T_{rel} = \frac{T_R - T_S}{T_S} \times 100 \quad (31)$$

$$\Delta P_{rel} = \frac{P_R - P_S}{P_S} \times 100 \quad (32)$$

$$\Delta \rho_{rel} = \frac{\rho_R - \rho_S}{\rho_S} \times 100, \quad (33)$$

where the subscript "R" denotes parameters from the atmosphere defined by this report and "S" denotes parameters from the U. S. Standard Atmosphere, 1962.

These relative differences are illustrated in Figure 3 and are related by the following equations:

$$\Delta T_{rel} = \frac{\Delta P_{rel} - \Delta \rho_{rel}}{1 + \left( \frac{\Delta \rho_{rel}}{100} \right)} \quad (34)$$

$$\Delta P_{rel} = \Delta T_{rel} + \Delta \rho_{rel} + \Delta \rho_{rel} \left( \frac{\Delta T_{rel}}{100} \right) \quad (35)$$

$$\Delta \rho_{rel} = \frac{\Delta P_{rel} - \Delta T_{rel}}{\left( \frac{\Delta T_{rel}}{100} + 1 \right)} \quad (36)$$

As can be seen by Equation (34), if  $\Delta \rho_{rel}$  is zero,  $\Delta T_{rel}$  would be equal to  $\Delta P_{rel}$ . Also, by Equation (35), if  $\Delta T_{rel}$  is zero, then  $\Delta P_{rel}$  would be equal to  $\Delta \rho_{rel}$ . It may be noted, in Figure 3, that maximum relative pressure differences occur with increasing altitude as the corresponding relative temperature differences approach zero from positive values. Conversely, minimum relative pressure differences occur as the corresponding temperature differences approach zero from negative values.

#### SECTION IV. CONCLUSION

The atmosphere defined by this report is an improved representation of the actual atmospheric conditions over Cape Kennedy, Florida. It is defined to 90 km altitude and is extended to 700 km altitude. However, as the understanding of the structure of the atmosphere is improved by more frequent and more accurate measurements, any atmospheric model established at this time for altitudes greater than 30 km is likely to be replaced.

It is recommended that this reference atmosphere be employed in missile and space vehicle design, performance, and trajectory studies regarding the Eastern Test Range, Patrick Air Force Base (Cape Kennedy), Florida launch area. Designation of the subroutines used in this report as "Computer Subroutine, No. PRA-63" by the MSFC Computation Laboratory for use in MSFC vehicle development should be given in subsequent revisions of MSFC Design Criteria Manuals and Ground Rule Documents.

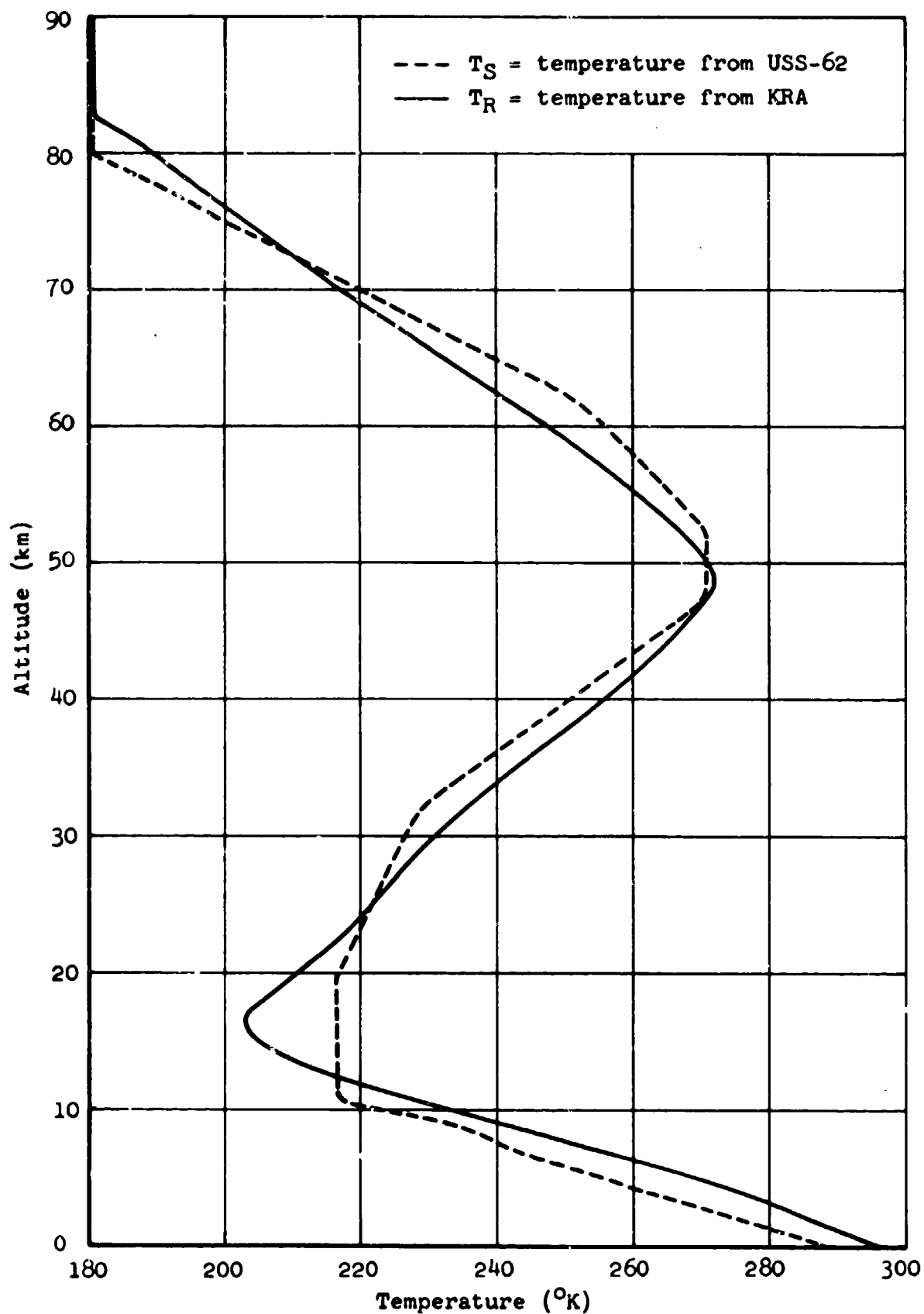


Fig. 1. Comparison of U.S. Standard Atmosphere, 1962 and Cape Kennedy Reference Atmosphere Temperature Profiles.

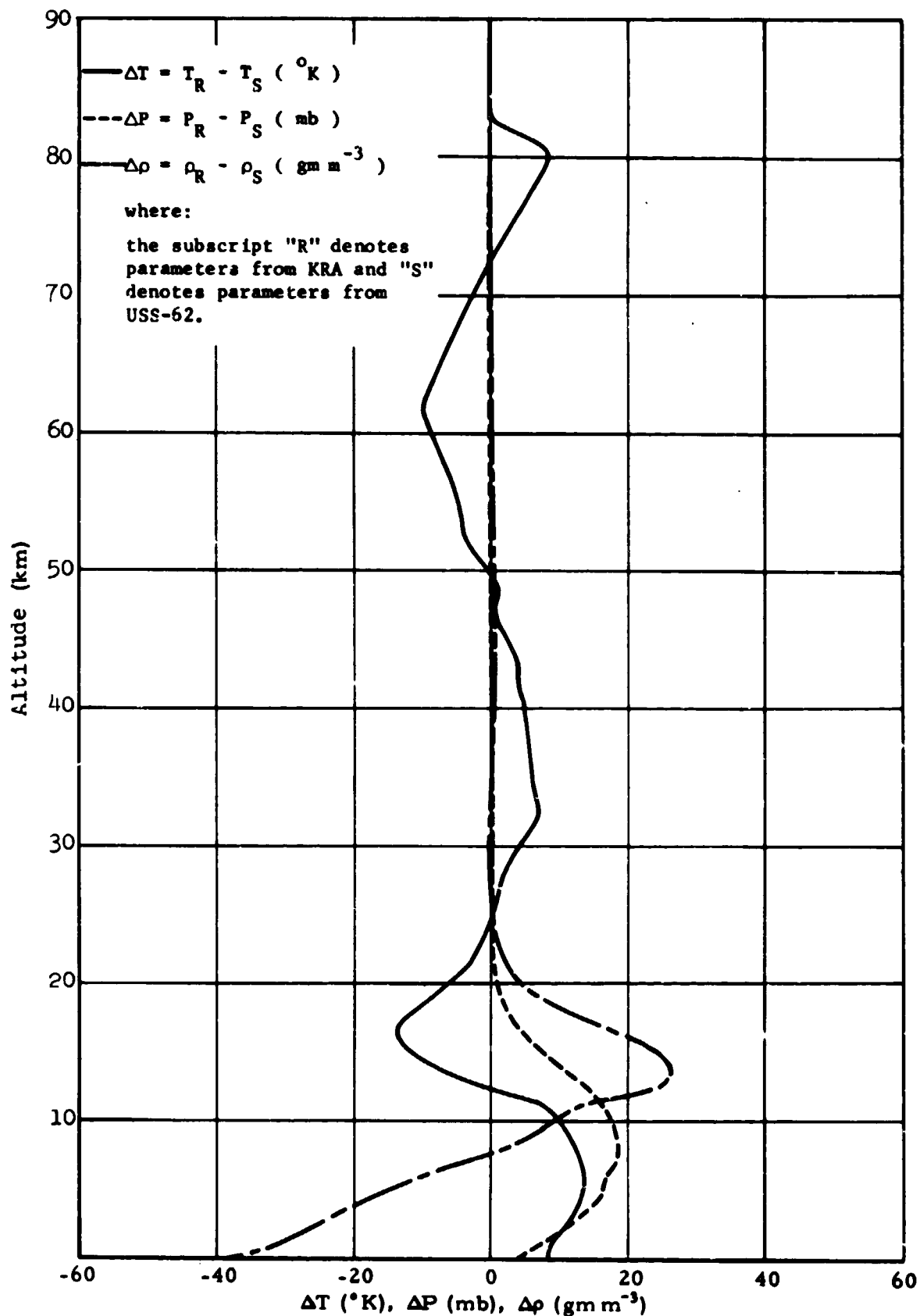


Fig. 2. Absolute Differences Between Thermodynamic Quantities of the Cape Kennedy Reference Atmosphere and the U. S. Standard Atmosphere, 1962, Versus Geometric Altitude.



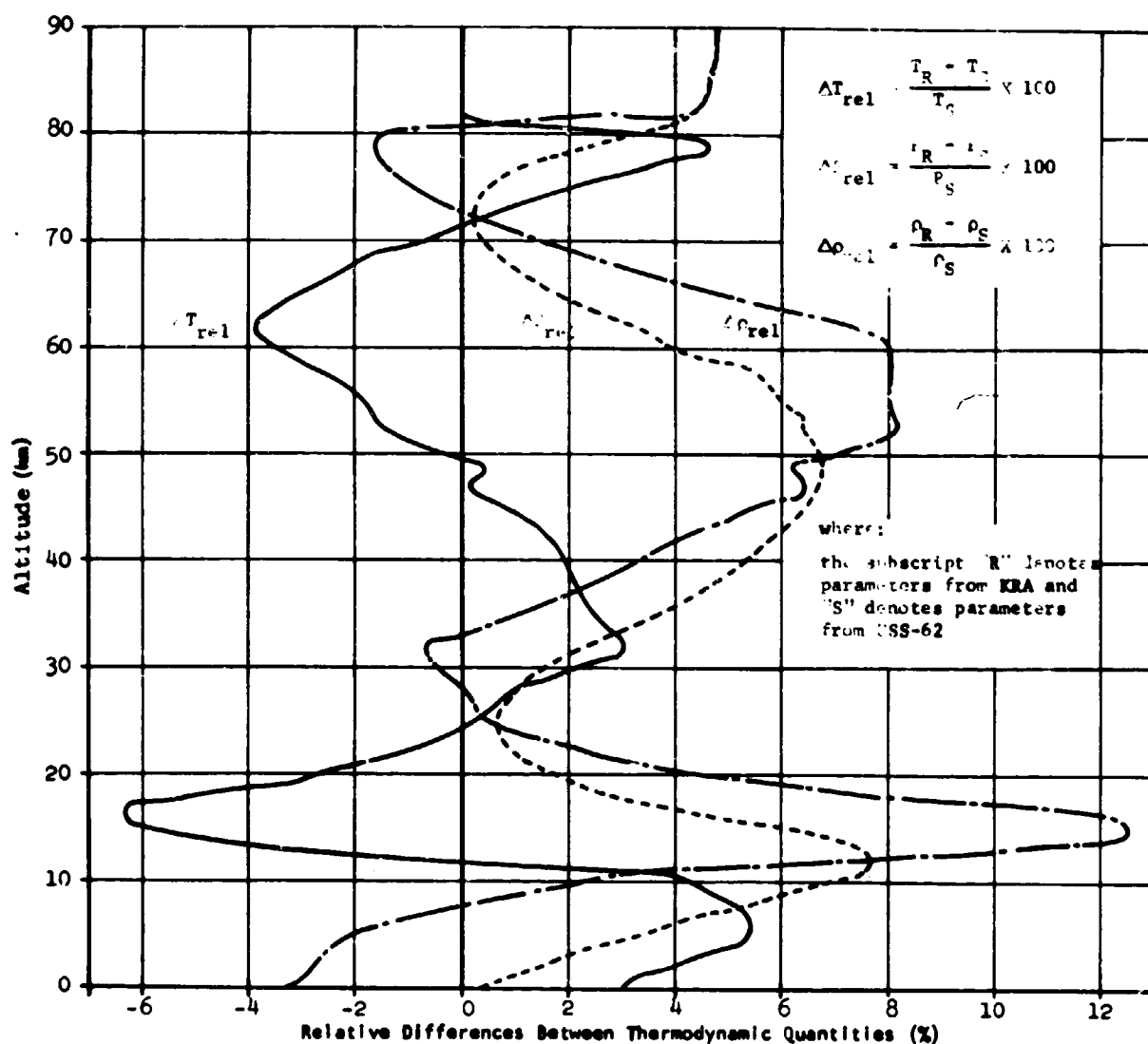


Fig. 3. Relative Differences Between Thermodynamic Quantities of the Cape Kennedy Reference Atmosphere and the U.S. Standard Atmosphere Versus Geometric Altitude.

**TABLE I**  
**CAPE KENNEDY ANNUAL MEDIAN THERMODYNAMIC QUANTITIES**  
**versus**  
**STANDARD PRESSURE LEVELS**

STANDARD PRESSURE LEVEL (mb)	TEMPERATURE (°C)	RELATIVE HUMIDITY (%)	GEOPOTENTIAL HEIGHT (m)	DENSITY (gm <sup>-3</sup> )
1000	22.7	81	151.0	1163.1
950	19.9	80	603.4	1116.7
900	17.1	78	1060.3	1069.2
850	14.4	73	1546.1	1020.1
800	20.0	65	2055.7	969.2
750	9.4	48	2604.7	917.5
700	6.4	45	3161.8	865.5
650	3.2	35	3777.0	813.7
600	- 0.7	31	4410.4	761.2
550	- 4.8	26	5107.7	710.4
500	- 9.5	23	5843.0	655.5
450	-15.0		6662.7	602.0
400	-21.2		7529.7	548.4
350	-28.5		8500.1	496.1
300	-36.8		9585.1	439.8
250	-46.1		10819.5	381.6
200	-56.0		12265.2	318.9
175	-60.8		13103.4	285.4
150	-65.0		14051.5	249.0
125	-68.4		15154.2	212.6
100	-70.4		16484.8	171.7
80	-68.9		17807.1	136.4
60	-63.7		19539.5	99.8
50	-60.5		20663.6	81.9
40	-57.1		22063.8	64.6
30	-53.4		23898.3	47.6
20	-48.7		26534.4	31.2
10	-41.6		31200.9	15.2

TABLE II  
DERIVED COEFFICIENTS FOR EMPIRICAL POLYNOMIALS

Log I 0 = Z < 10832.1 meters							
Parameters	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	Equation
Pressure	1.5871582x10 <sup>-2</sup>	-1.1425176x10 <sup>-4</sup>	-1.3612327x10 <sup>-9</sup>	7.3624145x10 <sup>-14</sup>	-1.0800315x10 <sup>-17</sup>	3.7756432x10 <sup>-22</sup>	(4)
Density	1.3302117x10 <sup>-2</sup>	-8.8502064x10 <sup>-5</sup>	-4.2143056x10 <sup>-9</sup>	5.9517557x10 <sup>-13</sup>	-3.9744789x10 <sup>-17</sup>	7.8771273x10 <sup>-22</sup>	(10)
Temperature	2.9667877x10 <sup>2</sup>	-6.7731001x10 <sup>-3</sup>	8.4619805x10 <sup>-7</sup>	-1.7004049x10 <sup>-10</sup>	1.1451454x10 <sup>-14</sup>	-2.4898768x10 <sup>-19</sup>	(16)
Virtual Temp.	2.9937265x10 <sup>2</sup>	-7.7176284x10 <sup>-3</sup>	9.4867202x10 <sup>-7</sup>	-1.7136592x10 <sup>-10</sup>	1.1074297x10 <sup>-14</sup>	-2.3294094x10 <sup>-19</sup>	(15)
Log II 10832.1 ≤ Z < 17853.3 meters							
Parameters	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	Equation
Pressure	-7.9910777x10 <sup>-2</sup>	-8.1046438x10 <sup>-5</sup>	-5.5223383x10 <sup>-9</sup>	3.1116969x10 <sup>-13</sup>	-1.6687827x10 <sup>-17</sup>	3.8319351x10 <sup>-22</sup>	(4)
Density	1.2667122x10 <sup>-1</sup>	-1.3373147x10 <sup>-4</sup>	2.0667371x10 <sup>-9</sup>	2.3396109x10 <sup>-13</sup>	-3.2562503x10 <sup>-17</sup>	7.9035209x10 <sup>-22</sup>	(10)
Temperature	2.6892151x10 <sup>2</sup>	4.3075352x10 <sup>-3</sup>	-8.9159672x10 <sup>-7</sup>	-2.8929791x10 <sup>-11</sup>	5.0724856x10 <sup>-15</sup>	-1.1490372x10 <sup>-19</sup>	(16)
Virtual Temp.	2.6892151x10 <sup>2</sup>	4.3075352x10 <sup>-3</sup>	-8.9159672x10 <sup>-7</sup>	-2.8929791x10 <sup>-11</sup>	5.0724856x10 <sup>-15</sup>	-1.1490372x10 <sup>-19</sup>	(15)
Log III 17853.3 ≤ Z < 28000 meters							
Parameters	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	Equation
Pressure	9.8414277x10 <sup>-1</sup>	-2.6976917x10 <sup>-4</sup>	8.5227541x10 <sup>-9</sup>	-3.9620263x10 <sup>-13</sup>	1.0146471x10 <sup>-17</sup>	-1.0264318x10 <sup>-22</sup>	(4)
Density	9.2751266x10 <sup>-1</sup>	-1.4349679x10 <sup>-4</sup>	-2.8271736x10 <sup>-9</sup>	4.7480092x10 <sup>-14</sup>	1.8863246x10 <sup>-18</sup>	-4.2702411x10 <sup>-23</sup>	(10)
Temperature	3.7064557x10 <sup>2</sup>	-3.2858965x10 <sup>-2</sup>	2.0645636x10 <sup>-6</sup>	-4.3283944x10 <sup>-11</sup>	-5.7507242x10 <sup>-17</sup>	8.2924583x10 <sup>-21</sup>	(16)
Virtual Temp.	3.7064557x10 <sup>2</sup>	-3.2858965x10 <sup>-2</sup>	2.0645636x10 <sup>-6</sup>	-4.3283944x10 <sup>-11</sup>	-5.7507242x10 <sup>-17</sup>	8.2924583x10 <sup>-21</sup>	(15)
Log IV 28000 ≤ Z < 49000 meters							
Parameters	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	Equation
Pressure	1.14118495x10 <sup>1</sup>	-4.11497477x10 <sup>-4</sup>	1.33664855x10 <sup>-8</sup>	-3.59518975x10 <sup>-13</sup>	5.10097254x10 <sup>-18</sup>	-2.89055894x10 <sup>-23</sup>	(5)
Temperature	2.044798x10 <sup>1</sup>	2.07698384x10 <sup>-2</sup>	-8.63038789x10 <sup>-7</sup>	1.66392417x10 <sup>-11</sup>	-9.30076185x10 <sup>-17</sup>	-4.09005108x10 <sup>-22</sup>	(2) & (16)
Log V 49000 ≤ Z < 83004 meters							
Parameters	A <sub>0</sub>	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	Equation
Pressure	9.99324461x10 <sup>0</sup>	-2.58298177x10 <sup>-4</sup>	3.76139346x10 <sup>-9</sup>	-4.20887236x10 <sup>-14</sup>	1.60182148x10 <sup>-19</sup>	-1.92508927x10 <sup>-23</sup>	(5)
Temperature	-4.98865953x10 <sup>2</sup>	3.92137281x10 <sup>-2</sup>	-4.95180601x10 <sup>-7</sup>	-3.26219854x10 <sup>-12</sup>	9.66640364x10 <sup>-17</sup>	-4.78844279x10 <sup>-22</sup>	(2) & (16)

# NOTE ON TABULAR VALUES IN TABLE III

The two digit numbers that are preceded by the symbol E indicate the power of 10 by which the respective principle value must be multiplied.

For example, a tabular value indicated as:

2.9937265E 02 is 299.37265

and

1.5464054E-05 is .000015464054

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

## TABLE III

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	VIRTUAL TEMPERATURE	DENSITY	KINEMATIC VISCOSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	m <sup>2</sup> sec <sup>-1</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
0.	1.0170147E 01	2.9667877E 02	2.9937265E 02	1.1835467E 00	1.5464054E-05	1.8302431E-05	3.4685752E 02
250.	9.8824373E 00	2.9503578E 02	2.9745989E 02	1.1573533E 00	1.5746406E-05	1.8225157E-05	3.4577091E 02
500.	9.6022651E 00	2.9348321E 02	2.9573026E 02	1.1312045E 00	1.6044844E-05	1.8149999E-05	3.4474100E 02
750.	9.3280864E 00	2.9200674E 02	2.9404920E 02	1.1051789E 00	1.6358708E-05	1.8079299E-05	3.4375977E 02
1000.	9.0603418E 00	2.9059301E 02	2.9244316E 02	1.0793462E 00	1.6687362E-05	1.8011441E-05	3.4281972E 02
1250.	8.7989596E 00	2.8922965E 02	2.9089953E 02	1.0537666E 00	1.7030194E-05	1.7945850E-05	3.4191375E 02
1500.	8.5488573E 00	2.8790525E 02	2.8940665E 02	1.0284922E 00	1.7386608E-05	1.7881991E-05	3.4103527E 02
1750.	8.2949430E 00	2.8660932E 02	2.8795373E 02	1.0035670E 00	1.7756031E-05	1.7819367E-05	3.4017814E 02
2000.	8.0521168E 00	2.8533228E 02	2.8653088E 02	9.7902801E-01	1.8137912E-05	1.7757524E-05	3.3933664E 02
2250.	7.8152728E 00	2.8406543E 02	2.8512905E 02	9.5490568E-01	1.8531717E-05	1.7696042E-05	3.3850555E 02
2500.	7.5843002E 00	2.8280087E 02	2.8374002E 02	9.3122447E-01	1.8936939E-05	1.7634547E-05	3.3768001E 02
2750.	7.3590843E 00	2.8153150E 02	2.8235634E 02	9.0800345E-01	1.9353094E-05	1.7572678E-05	3.3685564E 02
3000.	7.1345065E 00	2.8025121E 02	2.8097134E 02	8.8525681E-01	1.9779728E-05	1.7510139E-05	3.3602846E 02
3250.	6.9244477E 00	2.7895429E 02	2.7957909E 02	8.6299447E-01	2.0216415E-05	1.7446653E-05	3.3519489E 02
3500.	6.7167869E 00	2.7763601E 02	2.7817435E 02	8.4122243E-01	2.0662760E-05	1.7381977E-05	3.3435175E 02
3750.	6.5134029E 00	2.7632924E 02	2.7675260E 02	8.1994327E-01	2.1118413E-05	1.7315901E-05	3.3349622E 02
4000.	6.3151745E 00	2.7491954E 02	2.7530995E 02	7.9915662E-01	2.1583059E-05	1.7248245E-05	3.3262585E 02
4250.	6.1219816E 00	2.7351511E 02	2.7384314E 02	7.7885945E-01	2.2056429E-05	1.7178058E-05	3.3173858E 02
4500.	5.9370501E 00	2.7207674E 02	2.7234951E 02	7.5904667E-01	2.2538305E-05	1.7107621E-05	3.3083264E 02
4750.	5.7502279E 00	2.7060280E 02	2.7082700E 02	7.3971052E-01	2.3028518E-05	1.7034437E-05	3.2990662E 02
5000.	5.5714348E 00	2.6909222E 02	2.6927405E 02	7.2084275E-01	2.3526960E-05	1.6959239E-05	3.2895940E 02
5250.	5.3972132E 00	2.6754444E 02	2.6768988E 02	7.0243297E-01	2.4033585E-05	1.6881983E-05	3.2799020E 02
5500.	5.2274531E 00	2.6595939E 02	2.6607333E 02	6.8446986E-01	2.4548412E-05	1.6802648E-05	3.2699847E 02
5750.	5.0620471E 00	2.6433747E 02	2.6442497E 02	6.6694129E-01	2.5071532E-05	1.6721240E-05	3.2598400E 02
6000.	4.9008912E 00	2.6267950E 02	2.6274496E 02	6.4983435E-01	2.5603110E-05	1.6637781E-05	3.2494679E 02
6250.	4.7438843E 00	2.6098670E 02	2.6103412E 02	6.3313566E-01	2.6143393E-05	1.6552315E-05	3.2388713E 02
6500.	4.5909286E 00	2.5926069E 02	2.5929361E 02	6.1683158E-01	2.6692708E-05	1.6464908E-05	3.2280552E 02
6750.	4.4412996E 00	2.5750339E 02	2.5752466E 02	6.0090817E-01	2.7251477E-05	1.6375635E-05	3.2170270E 02
7000.	4.2967959E 00	2.5571708E 02	2.5573002E 02	5.8535153E-01	2.7820208E-05	1.6284601E-05	3.2057962E 02
7250.	4.1554397E 00	2.5390429E 02	2.5391096E 02	5.7014776E-01	2.8399511E-05	1.6191918E-05	3.1943741E 02
7500.	4.0177761E 00	2.5206783E 02	2.5207021E 02	5.5528319E-01	2.8990096E-05	1.6097713E-05	3.1827741E 02
7750.	3.8837237E 00	2.5021074E 02	2.5021046E 02	5.4074435E-01	2.9592781E-05	1.6002129E-05	3.1710112E 02
8000.	3.7532040E 00	2.4833672E 02	2.4833459E 02	5.2651817E-01	3.0208491E-05	1.5905319E-05	3.1591021E 02
8250.	3.6261415E 00	2.4644770E 02	2.4644571E 02	5.1259196E-01	3.0838268E-05	1.5807448E-05	3.1470648E 02
8500.	3.5024639E 00	2.4455860E 02	2.4454707E 02	4.9895351E-01	3.1483272E-05	1.5708489E-05	3.1349187E 02
8750.	3.3821013E 00	2.4266284E 02	2.4264207E 02	4.8559116E-01	3.2144787E-05	1.5609225E-05	3.1226845E 02
9000.	3.2649869E 00	2.4077389E 02	2.4073420E 02	4.7249387E-01	3.2824226E-05	1.5509244E-05	3.1103836E 02
9250.	3.1510561E 00	2.3887562E 02	2.3882706E 02	4.5965099E-01	3.3523131E-05	1.5408941E-05	3.0980386E 02
9500.	3.0402469E 00	2.3692182E 02	2.3692429E 02	4.4705284E-01	3.4243187E-05	1.5308514E-05	3.0856726E 02
9750.	2.9324993E 00	2.3502631E 02	2.3502955E 02	4.3469070E-01	3.4986216E-05	1.5208165E-05	3.0733094E 02
10000.	2.8277555E 00	2.3314283E 02	2.3314652E 02	4.2255460E-01	3.5754185E-05	1.5108096E-05	3.0609732E 02
10250.	2.7259597E 00	2.3127509E 02	2.3127885E 02	4.1063847E-01	3.6549218E-05	1.5008507E-05	3.0486892E 02
10500.	2.6270579E 00	2.2942670E 02	2.2943012E 02	3.9893405E-01	3.7373593E-05	1.4909599E-05	3.0364789E 02
10750.	2.5309974E 00	2.2760114E 02	2.2760385E 02	3.8743564E-01	3.8229747E-05	1.4811567E-05	3.0243694E 02
11000.	2.4373144E 00	2.2576754E 02	2.2576754E 02	3.7638429E-01	3.9076662E-05	1.4707842E-05	3.0115374E 02
11250.	2.3466644E 00	2.2389290E 02	2.2389290E 02	3.6538888E-01	3.9994484E-05	1.4611367E-05	2.9996129E 02
11500.	2.2574559E 00	2.2215274E 02	2.2215274E 02	3.5436502E-01	4.0966009E-05	1.4516921E-05	2.9879332E 02
11750.	2.1735153E 00	2.2046105E 02	2.2046105E 02	3.4360979E-01	4.1980165E-05	1.4424796E-05	2.9765344E 02
12000.	2.0909281E 00	2.1882266E 02	2.1882266E 02	3.3302120E-01	4.3046155E-05	1.4335282E-05	2.9654540E 02
12250.	2.0109393E 00	2.1724226E 02	2.1724226E 02	3.2259810E-01	4.4168460E-05	1.4248661E-05	2.9547260E 02
12500.	1.9335036E 00	2.1572436E 02	2.1572436E 02	3.1234019E-01	4.5351869E-05	1.4165211E-05	2.9443853E 02
12750.	1.8585748E 00	2.1427329E 02	2.1427329E 02	3.0224786E-01	4.6601486E-05	1.4085200E-05	2.9344629E 02
13000.	1.7861068E 00	2.1289318E 02	2.1289318E 02	2.9232219E-01	4.7922760E-05	1.4008886E-05	2.9250004E 02
13250.	1.7160527E 00	2.1158795E 02	2.1158795E 02	2.8256482E-01	4.9321493E-05	1.3936519E-05	2.9160707E 02
13500.	1.6483655E 00	2.1036130E 02	2.1036130E 02	2.7297794E-01	5.0803867E-05	1.3868335E-05	2.9075551E 02
13750.	1.5829980E 00	2.0921670E 02	2.0921670E 02	2.6356414E-01	5.2376472E-05	1.3804560E-05	2.8996141E 02
14000.	1.5199024E 00	2.0815732E 02	2.0815732E 02	2.5432637E-01	5.4046313E-05	1.3745403E-05	2.8922834E 02
14250.	1.4590316E 00	2.0718613E 02	2.0718613E 02	2.4526789E-01	5.5820832E-05	1.3691058E-05	2.8855274E 02
14500.	1.4003371E 00	2.0630573E 02	2.0630573E 02	2.3639213E-01	5.7707945E-05	1.3641704E-05	2.8791417E 02
14750.	1.3437711E 00	2.0551865E 02	2.0551865E 02	2.2770271E-01	5.9716027E-05	1.3597501E-05	2.8738935E 02
15000.	1.2892896E 00	2.0482679E 02	2.0482679E 02	2.1920326E-01	6.1853361E-05	1.3558590E-05	2.8690521E 02
15250.	1.2368327E 00	2.0423197E 02	2.0423197E 02	2.1089744E-01	6.4131138E-05	1.3525097E-05	2.8648832E 02
15500.	1.1863629E 00	2.0373557E 02	2.0373557E 02	2.0278882E-01	6.6574500E-05	1.3497107E-05	2.8613994E 02
15750.	1.1378295E 00	2.0333869E 02	2.0333869E 02	1.9488097E-01	6.9143324E-05	1.3474711E-05	2.8586110E 02
16000.	1.0911841E 00	2.0304201E 02	2.0304201E 02	1.8717685E-01	7.1894693E-05	1.3457958E-05	2.8565248E 02
16250.	1.0463788E 00	2.0284587E 02	2.0284587E 02	1.7967978E-01	7.4838014E-05	1.3446878E-05	2.8548149E 02
16500.	1.0034444E 00	2.0274507E 02	2.0274507E 02	1.7239240E-01	7.7970223E-05	1.3441474E-05	2.8534749E 02
16750.	9.6209732E-01	2.0274470E 02	2.0274470E 02	1.6531714E-01	8.1318715E-05	1.3441724E-05	2.8525030E 02
17000.	9.2252642E-01	2.0289831E 02	2.0289831E 02	1.5845603E-01	8.4866322E-05	1.3447579E-05	2.8522323E 02
17250.	8.8456068E-01	2.0305981E 02	2.0305981E 02	1.5181071E-01	8.8656214E-05	1.3458963E-05	2.8536500E 02
17500.	8.4828975E-01	2.0335748E 02	2.0335748E 02	1.4538244E-01	9.2691802E-05	1.3475772E-05	2.8567431E 02
17750.	8.1353127E-01	2.0374913E 02	2.0374913E 02	1.3917203E-01	9.6986954E-05	1.3497872E-05	2.8604966E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III

	GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
	meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
	-0.	9.9999996E-01	9.9999995E-01	1.0000000E 00	2.8964400E 01	2.3841858E-07	
	250.	9.7175951E-01	9.7786878E-01	9.9372337E-01		2.8720987E-01	
	500.	9.4416186E-01	9.5577506E-01	9.9167156E-01		5.8788206E-01	
	750.	9.1720269E-01	9.3378559E-01	9.8780868E-01		6.4206080E-01	
	1000.	8.9087617E-01	9.1195906E-01	9.8410108E-01		1.1098053E 00	
	1250.	8.6517525E-01	8.9036644E-01	9.8051734E-01		1.3711876E 00	
	1500.	8.4009180E-01	8.6899180E-01	9.7702823E-01		1.6268898E 00	
	1750.	8.1561808E-01	8.4793186E-01	9.7360662E-01		1.8792028E 00	
	2000.	7.9174043E-01	8.2719843E-01	9.7022765E-01		2.1180304E 00	
	2250.	7.6845227E-01	8.0681703E-01	9.6686848E-01		2.3948744E 00	
	2500.	7.4574143E-01	7.8680835E-01	9.6350816E-01		2.6858470E 00	
	2750.	7.2359660E-01	7.6718890E-01	9.6012805E-01		2.8110632E 00	
	3000.	7.0200620E-01	7.4796946E-01	9.5671116E-01		3.0306487E 00	
	3250.	6.8095845E-01	7.2915960E-01	9.5324244E-01		3.2446979E 00	
	3500.	6.6044146E-01	7.1076401E-01	9.4970870E-01		3.4533603E 00	
	3750.	6.4044333E-01	6.9278488E-01	9.4609845E-01		3.6567443E 00	
	4000.	6.2095212E-01	6.7522185E-01	9.4240189E-01		3.8549727E 00	
	4250.	6.0197604E-01	6.5807240E-01	9.3861079E-01		4.0481656E 00	
	4500.	5.8344336E-01	6.4133206E-01	9.3471855E-01		4.2364422E 00	
	4750.	5.6540262E-01	6.2499476E-01	9.3071997E-01		4.4199193E 00	
	5000.	5.4782243E-01	6.0903305E-01	9.2661133E-01		4.5987126E 00	
	5250.	5.3069175E-01	5.9349830E-01	9.2239023E-01		4.7729340E 00	
	5500.	5.1399974E-01	5.7832093E-01	9.1805561E-01		4.9426941E 00	
	5750.	4.9773586E-01	5.6351072E-01	9.1360767E-01		5.1081001E 00	
	6000.	4.8188989E-01	5.4905677E-01	9.0904764E-01		5.2692560E 00	
	6250.	4.6645187E-01	5.3494775E-01	9.0437800E-01		5.4262629E 00	
	6500.	4.5141221E-01	5.2117212E-01	8.9960216E-01		5.5792186E 00	
	6750.	4.3676159E-01	5.0771816E-01	8.9472464E-01		5.7282175E 00	
	7000.	4.2249102E-01	4.9457407E-01	8.8975078E-01		5.8733513E 00	
	7250.	4.0859190E-01	4.8172814E-01	8.8468679E-01		6.0147074E 00	
	7500.	3.9505585E-01	4.6916876E-01	8.7953967E-01		6.1523710E 00	
	7750.	3.8187487E-01	4.5688466E-01	8.7431720E-01		6.2864235E 00	
	8000.	3.6904126E-01	4.4486470E-01	8.6902775E-01		6.4169432E 00	
	8250.	3.5654760E-01	4.3309820E-01	8.6368030E-01		6.5440056E 00	
	8500.	3.4438674E-01	4.2157483E-01	8.5828435E-01		6.6676832E 00	
	8750.	3.3255185E-01	4.1028473E-01	8.5284985E-01		6.7870459E 00	
	9000.	3.2103615E-01	3.9721856E-01	8.4738715E-01		6.9051602E 00	
	9250.	3.0983387E-01	3.8836742E-01	8.4190682E-01		7.0190911E 00	
	9500.	2.9893833E-01	3.7772301E-01	8.3641976E-01		7.1299003E 00	
	9750.	2.8834384E-01	3.6727760E-01	8.3093694E-01		7.2376479E 00	
	10000.	2.7804469E-01	3.5702401E-01	8.2566939E-01		7.3423917E 00	
	10250.	2.6803542E-01	3.4695566E-01	8.2002810E-01		7.4441875E 00	
	10500.	2.5831070E-01	3.3706658E-01	8.1462401E-01		7.5430893E 00	
	10750.	2.4886536E-01	3.275136E-01	8.0926777E-01		7.6391498E 00	
	11000.	2.3965380E-01	3.1801388E-01	8.0360048E-01		7.7328327E 00	
	11250.	2.3074045E-01	3.0863917E-01	7.9832937E-01		7.8236829E 00	
	11500.	2.2209770E-01	2.9940940E-01	7.9316903E-01		7.9114012E 00	
	11750.	2.1371522E-01	2.9032211E-01	7.8813556E-01		7.9966319E 00	
	12000.	2.0559647E-01	2.8137562E-01	7.8324474E-01		8.0792190E 00	
	12250.	1.9772962E-01	2.7256896E-01	7.7851201E-01		8.1592078E 00	
	12500.	1.9011559E-01	2.6390186E-01	7.7395250E-01		8.2366436E 00	
	12750.	1.8274807E-01	2.5537467E-01	7.6958085E-01		8.3115723E 00	
	13000.	1.7562250E-01	2.4698829E-01	7.6541126E-01		8.3840404E 00	
	13250.	1.6873430E-01	2.3874412E-01	7.6145730E-01		8.4540944E 00	
	13500.	1.6207082E-01	2.3064399E-01	7.5773191E-01		8.5217816E 00	
	13750.	1.5565143E-01	2.2269010E-01	7.5424739E-01		8.5871491E 00	
	14000.	1.4944745E-01	2.1488494E-01	7.5101517E-01		8.6502445E 00	
	14250.	1.4346219E-01	2.0723127E-01	7.4804591E-01		8.7111155E 00	
	14500.	1.3769094E-01	1.9973198E-01	7.4534935E-01		8.7698100E 00	
	14750.	1.3212898E-01	1.9234013E-01	7.4293422E-01		8.8263760E 00	
	15000.	1.2677157E-01	1.8520879E-01	7.4080821E-01		8.8808615E 00	
	15250.	1.2161399E-01	1.7819105E-01	7.3897798E-01		8.9333149E 00	
	15500.	1.1665149E-01	1.7133994E-01	7.3744892E-01		8.9837842E 00	
	15750.	1.1187936E-01	1.6465836E-01	7.3622527E-01		9.0323176E 00	
	16000.	1.0729285E-01	1.5814910E-01	7.3530992E-01		9.0789630E 00	
	16250.	1.0288728E-01	1.5181469E-01	7.3470452E-01		9.1237883E 00	
	16500.	9.8657924E-02	1.4565755E-01	7.3440926E-01		9.1667815E 00	
	16750.	9.4600136E-02	1.3961943E-01	7.3442291E-01		9.2080498E 00	
	17000.	9.0709249E-02	1.3388234E-01	7.3474283E-01		9.2476207E 00	
	17250.	8.6980654E-02	1.2826761E-01	7.3536484E-01		9.2855411E 00	
	17500.	8.3409772E-02	1.2293823E-01	7.3628323E-01		9.3218975E 00	
	17750.	7.9992077E-02	1.1798892E-01	7.3749068E-01	2.8964400E 01	9.3566159E 00	

MOLECULAR WEIGHT CONSTANT TO 90,000 METERS

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	VIRTUAL TEMPERATURE	DENSITY	KINEMATIC VISCOSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	m <sup>2</sup> sec <sup>-1</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
18000.	7.8097365E-01	2.0530313E 02	2.0530313E 02	1.3239218E-01	1.0261471E-04	1.3585386E-05	2.8723862E 02
18250.	7.4940996E-01	2.0591008E 02	2.0591008E 02	1.2669197E-01	1.0753477E-04	1.3619491E-05	2.8766290E 02
18500.	7.1920093E-01	2.0652754E 02	2.0652754E 02	1.2117497E-01	1.1268123E-04	1.3654144E-05	2.8809388E 02
18750.	6.9028297E-01	2.0713585E 02	2.0713585E 02	1.1594899E-01	1.1806259E-04	1.3689238E-05	2.8853025E 02
19000.	6.6260092E-01	2.0778667E 02	2.0778667E 02	1.1096236E-01	1.2368766E-04	1.3724675E-05	2.8897076E 02
19250.	6.3609886E-01	2.0842488E 02	2.0842488E 02	1.0620395E-01	1.2956538E-04	1.3760356E-05	2.8941420E 02
19500.	6.1072356E-01	2.0906669E 02	2.0906669E 02	1.0166309E-01	1.3570500E-04	1.3796191E-05	2.8985945E 02
19750.	5.8642544E-01	2.0971051E 02	2.0971051E 02	9.7329618E-02	1.4211596E-04	1.3832092E-05	2.9030542E 02
20000.	5.6315652E-01	2.1035486E 02	2.1035486E 02	9.3193799E-02	1.4886793E-04	1.3867977E-05	2.9075100E 02
20250.	5.4087104E-01	2.1099834E 02	2.1099834E 02	8.9246359E-02	1.5579085E-04	1.3903766E-05	2.9119545E 02
20500.	5.1952588E-01	2.1163959E 02	2.1163959E 02	8.5478439E-02	1.6307487E-04	1.3939385E-05	2.9163759E 02
20750.	4.9907848E-01	2.1227735E 02	2.1227735E 02	8.1881557E-02	1.7067049E-04	1.3974765E-05	2.9207668E 02
21000.	4.7949016E-01	2.1291042E 02	2.1291042E 02	7.8447674E-02	1.7858834E-04	1.4009840E-05	2.9251180E 02
21250.	4.6072266E-01	2.1353768E 02	2.1353768E 02	7.5169075E-02	1.8683947E-04	1.4044550E-05	2.9294246E 02
21500.	4.4373989E-01	2.1415898E 02	2.1415898E 02	7.2028915E-02	1.9543515E-04	1.4078838E-05	2.9336769E 02
21750.	4.2850730E-01	2.1477067E 02	2.1477067E 02	6.9048699E-02	2.0438693E-04	1.4112651E-05	2.9378698E 02
22000.	4.0899191E-01	2.1537455E 02	2.1537455E 02	6.6193250E-02	2.1370675E-04	1.4145946E-05	2.9419972E 02
22250.	3.9316222E-01	2.1596891E 02	2.1596891E 02	6.3465692E-02	2.2340689E-04	1.4178673E-05	2.9460538E 02
22500.	3.7798811E-01	2.1655302E 02	2.1655302E 02	6.0859976E-02	2.3349993E-04	1.4210800E-05	2.9500350E 02
22750.	3.6344091E-01	2.1712624E 02	2.1712624E 02	5.8370312E-02	2.4424292E-04	1.4242292E-05	2.9539368E 02
23000.	3.4949306E-01	2.1768800E 02	2.1768800E 02	5.5991186E-02	2.5491726E-04	1.4273120E-05	2.9577557E 02
23250.	3.3611832E-01	2.1823781E 02	2.1823781E 02	5.3717368E-02	2.6626877E-04	1.4303258E-05	2.9614805E 02
23500.	3.2329168E-01	2.1877527E 02	2.1877527E 02	5.1543851E-02	2.7866785E-04	1.4332680E-05	2.9651329E 02
23750.	3.1098906E-01	2.1930008E 02	2.1930008E 02	4.9465870E-02	2.9032938E-04	1.4361396E-05	2.9686872E 02
24000.	2.9918759E-01	2.1981200E 02	2.1981200E 02	4.7478898E-02	3.0306874E-04	1.4389370E-05	2.9721502E 02
24250.	2.8786539E-01	2.2031091E 02	2.2031091E 02	4.5578615E-02	3.1630195E-04	1.4416605E-05	2.9755212E 02
24500.	2.7700151E-01	2.2079671E 02	2.2079671E 02	4.3760915E-02	3.3004564E-04	1.4443099E-05	2.9788000E 02
24750.	2.6657591E-01	2.2126948E 02	2.2126948E 02	4.2021881E-02	3.4431725E-04	1.4468859E-05	2.9819874E 02
25000.	2.5656950E-01	2.2172934E 02	2.2172934E 02	4.0357794E-02	3.5913489E-04	1.4493892E-05	2.9850845E 02
25250.	2.4696393E-01	2.2217646E 02	2.2217646E 02	3.8765104E-02	3.7451754E-04	1.4518211E-05	2.9880929E 02
25500.	2.3774181E-01	2.2261124E 02	2.2261124E 02	3.7240437E-02	3.9048512E-04	1.4541836E-05	2.9910150E 02
25750.	2.2888635E-01	2.2303400E 02	2.2303400E 02	3.5780583E-02	4.0705849E-04	1.4564706E-05	2.9938538E 02
26000.	2.2038159E-01	2.2344526E 02	2.2344526E 02	3.4382489E-02	4.2425962E-04	1.4587102E-05	2.9966127E 02
26250.	2.1221229E-01	2.2384560E 02	2.2384560E 02	3.3043241E-02	4.4211172E-04	1.4608804E-05	2.9992961E 02
26500.	2.0436382E-01	2.2423573E 02	2.2423573E 02	3.1760079E-02	4.6063921E-04	1.4629936E-05	3.0019086E 02
26750.	1.9682221E-01	2.2461640E 02	2.2461640E 02	3.0530360E-02	4.7986792E-04	1.4650541E-05	3.0044556E 02
27000.	1.8957414E-01	2.2498853E 02	2.2498853E 02	2.9351587E-02	4.9982535E-04	1.4670667E-05	3.0069433E 02
27250.	1.8260806E-01	2.2535303E 02	2.2535303E 02	2.8221373E-02	5.2054052E-04	1.4690368E-05	3.0093780E 02
27500.	1.7590816E-01	2.2571105E 02	2.2571105E 02	2.7137454E-02	5.4204438E-04	1.4709705E-05	3.0117677E 02
27750.	1.6946640E-01	2.2606372E 02	2.2606372E 02	2.6097671E-02	5.6436988E-04	1.4728740E-05	3.0141197E 02
28000.	1.6327363E-01	2.2643885E 02	2.2643885E 02	2.5119029E-02	5.8716331E-04	1.4748972E-05	3.0166194E 02
28250.	1.5729220E-01	2.2681720E 02	2.2681720E 02	2.4141415E-02	6.1214233E-04	1.4777982E-05	3.0202032E 02
28500.	1.5154519E-01	2.2718737E 02	2.2718737E 02	2.3204199E-02	6.3811838E-04	1.4807026E-05	3.0237907E 02
28750.	1.4602270E-01	2.2805774E 02	2.2805774E 02	2.2305569E-02	6.6513066E-04	1.4836119E-05	3.0273836E 02
29000.	1.4071528E-01	2.2860044E 02	2.2860044E 02	2.1443810E-02	6.9321970E-04	1.4865272E-05	3.0309836E 02
29250.	1.3561394E-01	2.2914508E 02	2.2914508E 02	2.0611728E-02	7.2242759E-04	1.4894498E-05	3.0345920E 02
29500.	1.3071014E-01	2.2969187E 02	2.2969187E 02	1.9824461E-02	7.5279778E-04	1.4923810E-05	3.0382105E 02
29750.	1.2593566E-01	2.3024104E 02	2.3024104E 02	1.9063850E-02	7.8437554E-04	1.4953217E-05	3.0418403E 02
30000.	1.2146271E-01	2.3079274E 02	2.3079274E 02	1.8336060E-02	8.1720744E-04	1.4982730E-05	3.0454826E 02
30250.	1.1710385E-01	2.3134718E 02	2.3134718E 02	1.7633751E-02	8.5134225E-04	1.5012357E-05	3.0491385E 02
30500.	1.1291193E-01	2.3190450E 02	2.3190450E 02	1.6961662E-02	8.8682977E-04	1.5042107E-05	3.0528090E 02
30750.	1.0888012E-01	2.3246485E 02	2.3246485E 02	1.6316577E-02	9.2372233E-04	1.5071986E-05	3.0564950E 02
31000.	1.0500319E-01	2.3302838E 02	2.3302838E 02	1.5697349E-02	9.6207348E-04	1.5102004E-05	3.0601975E 02
31250.	1.0127118E-01	2.3359519E 02	2.3359519E 02	1.5102878E-02	1.0019389E-03	1.5132162E-05	3.0639170E 02
31500.	9.7681967E-02	2.3416537E 02	2.3416537E 02	1.4532122E-02	1.0433760E-03	1.5162468E-05	3.0676541E 02
31750.	9.4228337E-02	2.3473924E 02	2.3473924E 02	1.3984082E-02	1.0864443E-03	1.5192926E-05	3.0714094E 02
32000.	9.0905080E-02	2.3531626E 02	2.3531626E 02	1.3457797E-02	1.1312058E-03	1.5223539E-05	3.0751834E 02
32250.	8.7706975E-02	2.3589708E 02	2.3589708E 02	1.2952372E-02	1.1772321E-03	1.5254309E-05	3.0789762E 02
32500.	8.4628981E-02	2.3648155E 02	2.3648155E 02	1.2466932E-02	1.2260625E-03	1.5285238E-05	3.0827881E 02
32750.	8.1666349E-02	2.3706971E 02	2.3706971E 02	1.2000652E-02	1.2762913E-03	1.5316328E-05	3.0866194E 02
33000.	7.8814489E-02	2.3766155E 02	2.3766155E 02	1.1552737E-02	1.3284798E-03	1.5347578E-05	3.0904698E 02
33250.	7.6068993E-02	2.3825710E 02	2.3825710E 02	1.1122427E-02	1.3827008E-03	1.5378989E-05	3.0943396E 02
33500.	7.3425727E-02	2.3885632E 02	2.3885632E 02	1.0709009E-02	1.4390274E-03	1.5410557E-05	3.0982283E 02
33750.	7.0883663E-02	2.3945918E 02	2.3945918E 02	1.0311789E-02	1.4975367E-03	1.5442282E-05	3.1021357E 02
34000.	6.8429914E-02	2.4006563E 02	2.4006563E 02	9.9301028E-03	1.5583081E-03	1.5474160E-05	3.1060615E 02
34250.	6.6069812E-02	2.4067561E 02	2.4067561E 02	9.5633194E-03	1.6214230E-03	1.5506187E-05	3.1100052E 02
34500.	6.3796784E-02	2.4128910E 02	2.4128910E 02	9.2108314E-03	1.6869660E-03	1.5538359E-05	3.1139663E 02
34750.	6.1607495E-02	2.4190591E 02	2.4190591E 02	8.8720665E-03	1.7550219E-03	1.5570671E-05	3.1179440E 02
35000.	5.9498632E-02	2.4252600E 02	2.4252600E 02	8.5444450E-03	1.8256808E-03	1.5603116E-05	3.1219375E 02
35250.	5.7467108E-02	2.4314924E 02	2.4314924E 02	8.2334940E-03	1.8990343E-03	1.5635687E-05	3.1259463E 02
35500.	5.5509918E-02	2.4377545E 02	2.4377545E 02	7.9326513E-03	1.9751751E-03	1.5668377E-05	3.1299690E 02
35750.	5.3624192E-02	2.4440454E 02	2.4440454E 02	7.6434488E-03	2.0542013E-03	1.5701179E-05	3.1340050E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

	GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
	meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
	18000.	7.6790792E-02	1.1186054E-01	7.4227225E-01	2.8964400E 01	9.3891735E 00	
	18250.	7.3687228E-02	1.0701054E-01	7.4413570E-01		9.4207371E 00	
	18500.	7.0716777E-02	1.0238292E-01	7.4602904E-01		9.4509470E 00	
	18750.	6.7873449E-02	9.7967392E-02	7.4794650E-01		9.4798651E 00	
	19000.	6.5151556E-02	9.3754101E-02	7.4988266E-01		9.5075462E 00	
	19250.	6.2545671E-02	8.9733634E-02	7.5183217E-01		9.5340484E 00	
	19500.	6.0050611E-02	8.5896982E-02	7.5379012E-01		9.5594236E 00	
	19750.	5.7661451E-02	8.2235550E-02	7.5575168E-01		9.5837216E 00	
	20000.	5.5373487E-02	7.8741122E-02	7.5771233E-01		9.6069904E 00	
	20250.	5.3182223E-02	7.5405859E-02	7.5966766E-01		9.6292760E 00	
	20500.	5.1083388E-02	7.2222272E-02	7.6161389E-01		9.6506215E 00	
	20750.	4.9072887E-02	6.9183205E-02	7.6354699E-01		9.6710687E 00	
	21000.	4.7146826E-02	6.6281855E-02	7.6546340E-01		9.6904570E 00	
	21250.	4.5301473E-02	6.3511708E-02	7.6735986E-01		9.7094245E 00	
	21500.	4.3533282E-02	6.0866556E-02	7.6923334E-01		9.7276072E 00	
	21750.	4.1838853E-02	5.8340492E-02	7.7108074E-01		9.7446394E 00	
	22000.	4.0214945E-02	5.5927871E-02	7.7289979E-01		9.7611552E 00	
	22250.	3.8658459E-02	5.3623308E-02	7.7468801E-01		9.7769849E 00	
	22500.	3.7166434E-02	5.1421692E-02	7.7644337E-01		9.7921598E 00	
	22750.	3.5736052E-02	4.9318132E-02	7.7816500E-01		9.8067862E 00	
	23000.	3.4364600E-02	4.7307963E-02	7.7984835E-01		9.8206540E 00	
	23250.	3.3049504E-02	4.5386774E-02	7.8149503E-01		9.8340288E 00	
	23500.	3.1788299E-02	4.3550330E-02	7.8310302E-01		9.8468554E 00	
	23750.	3.0578617E-02	4.1794406E-02	7.8467152E-01		9.8591580E 00	
	24000.	2.9418216E-02	4.0115778E-02	7.8619996E-01		9.8709595E 00	
	24250.	2.8304938E-02	3.8510194E-02	7.8768802E-01		9.8822818E 00	
	24500.	2.7236725E-02	3.6974387E-02	7.8913562E-01		9.8931456E 00	
	24750.	2.6211607E-02	3.550504 E-02	7.9054306E-01		9.9035712E 00	
	25000.	2.5227707E-02	3.4099728E-02	7.9191080E-01		9.9135777E 00	
	25250.	2.4283220E-02	3.2753335E-02	7.9323955E-01		9.9231832E 00	
	25500.	2.3376438E-02	3.1465117E-02	7.9453037E-01		9.9324054E 00	
	25750.	2.2505707E-02	3.0231640E-02	7.9578452E-01		9.9412608E 00	
	26000.	2.1669459E-02	2.9050386E-02	7.9700357E-01		9.9497456E 00	
	26250.	2.0866196E-02	2.7918830E-02	7.9818932E-01		9.9579359E 00	
	26500.	2.0094487E-02	2.6834661E-02	7.9934393E-01		9.9657834E 00	
	26750.	1.9352936E-02	2.5795652E-02	8.0046970E-01		9.9733249E 00	
	27000.	1.8640255E-02	2.4799686E-02	8.0156938E-01		9.9805729E 00	
	27250.	1.7955183E-02	2.3844747E-02	8.0264578E-01		9.9875402E 00	
	27500.	1.7296520E-02	2.2928925E-02	8.0370228E-01		9.9942390E 00	
	27750.	1.6663121E-02	2.2050393E-02	8.0474730E-01		1.0006681E 01	
	28000.	1.6054205E-02	2.1223521E-02	8.0584776E-01		1.0006873E 01	
	28250.	1.5464069E-02	2.0397517E-02	8.0743278E-01		1.0012855E 01	
	28500.	1.4900983E-02	1.9605646E-02	8.0901966E-01		1.0018602E 01	
	28750.	1.4357973E-02	1.8846378E-02	8.1060922E-01		1.0024129E 01	
	29000.	1.3836110E-02	1.8118262E-02	8.1220207E-01		1.0029432E 01	
	29250.	1.3334511E-02	1.7419919E-02	8.1379894E-01		1.0034533E 01	
	29500.	1.2852335E-02	1.6750045E-02	8.1540048E-01		1.0039437E 01	
	29750.	1.2388774E-02	1.6107391E-02	8.1700722E-01		1.0044151E 01	
	30000.	1.1943065E-02	1.5490770E-02	8.1861973E-01		1.0048684E 01	
	30250.	1.1514467E-02	1.4899794E-02	8.2023848E-01		1.0053053E 01	
	30500.	1.1102290E-02	1.4331214E-02	8.2186393E-01		1.0057235E 01	
	30750.	1.0705855E-02	1.3786170E-02	8.2349647E-01		1.0061267E 01	
	31000.	1.0324527E-02	1.3262973E-02	8.2513652E-01		1.0065145E 01	
	31250.	9.9576907E-03	1.2760694E-02	8.2678432E-01		1.0068876E 01	
	31500.	9.6047645E-03	1.2278452E-02	8.2844017E-01		1.0072465E 01	
	31750.	9.2651891E-03	1.1815403E-02	8.3010430E-01		1.0075919E 01	
	32000.	8.9384232E-03	1.1370735E-02	8.3177692E-01		1.0079242E 01	
	32250.	8.6239631E-03	1.0943693E-02	8.3345811E-01		1.0082440E 01	
	32500.	8.3213134E-03	1.0533536E-02	8.3514802E-01		1.0085518E 01	
	32750.	8.0300065E-03	1.0134567E-02	8.3684671E-01		1.0088481E 01	
	33000.	7.7495918E-03	9.7611161E-03	8.3855411E-01		1.0091332E 01	
	33250.	7.4796354E-03	9.3975394E-03	8.4027032E-01		1.0094078E 01	
	33500.	7.2197310E-03	9.0482346E-03	8.4199516E-01		1.0096721E 01	
	33750.	6.9694821E-03	8.7126163E-03	8.4372852E-01		1.0099266E 01	
	34000.	6.7285077E-03	8.3901230E-03	8.4547024E-01		1.0101717E 01	
	34250.	6.4964459E-03	8.0802215E-03	8.4722012E-01		1.0104077E 01	
	34500.	6.2729460E-03	7.782377E-03	8.4897795E-01		1.0106340E 01	
	34750.	6.0576797E-03	7.4961690E-03	8.5074338E-01		1.0108539E 01	
	35000.	5.8503222E-03	7.2210616E-03	8.5251606E-01		1.0110648E 01	
	35250.	5.6505679E-03	6.9566277E-03	8.5429571E-01		1.0112680E 01	
	35500.	5.4581233E-03	6.7024403E-03	8.5608178E-01		1.0114637E 01	
	35750.	5.2727056E-03	6.4580862E-03	8.5787399E-01	2.8964400E 01	1.0116529E 01	

MOLECULAR WEIGHT CONSTANT TO 50,000 METERS



# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	VIRTUAL TEMPERATURE	DENSITY	KINEMATIC VISCOSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	m <sup>2</sup> sec <sup>-1</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
36000.	5.1807184E-02	2.4503625E-02	2.4503628E-02	7.3654170E-03	2.1362103E-03	1.5734080E-05	3.1380528E-02
36250.	5.0056223E-02	2.4567055E-02	2.4567052E-02	7.0981041E-03	2.2213063E-03	1.5767073E-05	3.1421114E-02
36500.	4.8368751E-02	2.4630706E-02	2.4630706E-02	6.8410974E-03	2.3095922E-03	1.5800146E-05	3.1461794E-02
36750.	4.6742370E-02	2.4694566E-02	2.4694566E-02	6.5937717E-03	2.4011762E-03	1.5833288E-05	3.1502553E-02
37000.	4.5176757E-02	2.4758611E-02	2.4758610E-02	6.3563430E-03	2.4961657E-03	1.5866486E-05	3.1543376E-02
37250.	4.3663511E-02	2.4822817E-02	2.4822817E-02	6.1278247E-03	2.5946774E-03	1.5899729E-05	3.1584251E-02
37500.	4.2206814E-02	2.4887154E-02	2.4887154E-02	5.9080626E-03	2.6968231E-03	1.5933000E-05	3.1625156E-02
37750.	4.0802266E-02	2.4951598E-02	2.4951598E-02	5.6967042E-03	2.8027235E-03	1.5966287E-05	3.1666075E-02
38000.	3.9447995E-02	2.5016116E-02	2.5016116E-02	5.4934199E-03	2.9124978E-03	1.5999574E-05	3.1706989E-02
38250.	3.8126201E-02	2.5080608E-02	2.5080608E-02	5.2978887E-03	3.0262704E-03	1.6032884E-05	3.1747878E-02
38500.	3.6882693E-02	2.5145256E-02	2.5145256E-02	5.1098048E-03	3.1441673E-03	1.6066081E-05	3.1788723E-02
38750.	3.5668057E-02	2.5209809E-02	2.5209809E-02	4.9288731E-03	3.2663182E-03	1.6099269E-05	3.1829501E-02
39000.	3.4496486E-02	2.5274305E-02	2.5274305E-02	4.7548124E-03	3.3928543E-03	1.6132386E-05	3.1870190E-02
39250.	3.3366343E-02	2.5338705E-02	2.5338705E-02	4.5873508E-03	3.5239111E-03	1.6165417E-05	3.1910768E-02
39500.	3.2276080E-02	2.5402967E-02	2.5402967E-02	4.4262311E-03	3.6596231E-03	1.6198338E-05	3.1951207E-02
39750.	3.1224165E-02	2.5467356E-02	2.5467356E-02	4.2711993E-03	3.8001346E-03	1.6231132E-05	3.1991487E-02
40000.	3.0209180E-02	2.5530928E-02	2.5530928E-02	4.1220200E-03	3.9455843E-03	1.6263778E-05	3.2031579E-02
40250.	2.9229723E-02	2.5594537E-02	2.5594537E-02	3.9784617E-03	4.0961187E-03	1.6296252E-05	3.2071457E-02
40500.	2.8284457E-02	2.5657837E-02	2.5657837E-02	3.8403036E-03	4.2518854E-03	1.6328531E-05	3.2111092E-02
40750.	2.7372115E-02	2.5720782E-02	2.5720782E-02	3.7073359E-03	4.4130322E-03	1.6360593E-05	3.2150456E-02
41000.	2.6491242E-02	2.5783324E-02	2.5783324E-02	3.5793500E-03	4.5797177E-03	1.6392412E-05	3.2189520E-02
41250.	2.5641234E-02	2.5845410E-02	2.5845410E-02	3.4561553E-03	4.7520915E-03	1.6423966E-05	3.2228253E-02
41500.	2.4820392E-02	2.5906989E-02	2.5906989E-02	3.3375629E-03	4.9303122E-03	1.6455227E-05	3.2266623E-02
41750.	2.4027806E-02	2.5968005E-02	2.5968005E-02	3.2233931E-03	5.1145384E-03	1.6486168E-05	3.2304598E-02
42000.	2.3262411E-02	2.6028407E-02	2.6028407E-02	3.1134715E-03	5.3049350E-03	1.6516764E-05	3.2342147E-02
42250.	2.2523202E-02	2.6088134E-02	2.6088134E-02	3.0076332E-03	5.5016637E-03	1.6546987E-05	3.2379233E-02
42500.	2.1809203E-02	2.6147127E-02	2.6147127E-02	2.9057187E-03	5.7048901E-03	1.6576806E-05	3.2415822E-02
42750.	2.1119469E-02	2.6205329E-02	2.6205329E-02	2.8075735E-03	5.9147853E-03	1.6606195E-05	3.2451880E-02
43000.	2.0453115E-02	2.6262673E-02	2.6262673E-02	2.7130530E-03	6.1315131E-03	1.6635121E-05	3.2487367E-02
43250.	1.9809245E-02	2.6319098E-02	2.6319098E-02	2.6220120E-03	6.3552547E-03	1.6663554E-05	3.2522247E-02
43500.	1.9187063E-02	2.6374536E-02	2.6374536E-02	2.5343198E-03	6.5861708E-03	1.6691463E-05	3.2556482E-02
43750.	1.8585732E-02	2.6428923E-02	2.6428923E-02	2.4498413E-03	6.8244486E-03	1.6718816E-05	3.2590032E-02
44000.	1.8004513E-02	2.6482185E-02	2.6482185E-02	2.3684559E-03	7.0702506E-03	1.6745577E-05	3.2622854E-02
44250.	1.7442635E-02	2.6534256E-02	2.6534256E-02	2.2900392E-03	7.3237678E-03	1.6771716E-05	3.2654911E-02
44500.	1.6899401E-02	2.6585060E-02	2.6585060E-02	2.2144782E-03	7.5851708E-03	1.6797196E-05	3.2686158E-02
44750.	1.6374120E-02	2.6634524E-02	2.6634524E-02	2.1416613E-03	7.8546414E-03	1.6821981E-05	3.2716551E-02
45000.	1.5866134E-02	2.6682574E-02	2.6682574E-02	2.0714819E-03	8.1323606E-03	1.6846038E-05	3.2746049E-02
45250.	1.5374807E-02	2.6729129E-02	2.6729129E-02	2.0038380E-03	8.4185084E-03	1.6869327E-05	3.2774604E-02
45500.	1.4899529E-02	2.6774109E-02	2.6774109E-02	1.9386315E-03	8.7132648E-03	1.6891810E-05	3.2802169E-02
45750.	1.4439711E-02	2.6817436E-02	2.6817436E-02	1.8757674E-03	9.0168161E-03	1.6913450E-05	3.2828699E-02
46000.	1.3994781E-02	2.6859025E-02	2.6859025E-02	1.8151546E-03	9.3293467E-03	1.6934206E-05	3.2854145E-02
46250.	1.3564215E-02	2.6898792E-02	2.6898792E-02	1.7567042E-03	9.6510271E-03	1.6954039E-05	3.2878458E-02
46500.	1.3147466E-02	2.6936653E-02	2.6936653E-02	1.7003416E-03	9.9820579E-03	1.6972909E-05	3.2901589E-02
46750.	1.2744066E-02	2.6972512E-02	2.6972512E-02	1.6459792E-03	1.0322590E-02	1.6990770E-05	3.2923481E-02
47000.	1.2353487E-02	2.7006288E-02	2.7006288E-02	1.5935380E-03	1.0672843E-02	1.7007582E-05	3.2944089E-02
47250.	1.1975290E-02	2.7037884E-02	2.7037884E-02	1.5429473E-03	1.1032976E-02	1.7023301E-05	3.2963355E-02
47500.	1.1609022E-02	2.7067210E-02	2.7067210E-02	1.4941352E-03	1.1403173E-02	1.7037882E-05	3.2981226E-02
47750.	1.1254254E-02	2.7094166E-02	2.7094166E-02	1.4470338E-03	1.1783607E-02	1.7051279E-05	3.2997645E-02
48000.	1.0910564E-02	2.7118660E-02	2.7118660E-02	1.4015768E-03	1.2174463E-02	1.7063446E-05	3.3012557E-02
48250.	1.0577570E-02	2.7140590E-02	2.7140590E-02	1.3577018E-03	1.2575910E-02	1.7074335E-05	3.3025902E-02
48500.	1.0254871E-02	2.7159857E-02	2.7159857E-02	1.3153475E-03	1.2988126E-02	1.7083899E-05	3.3037623E-02
48750.	9.9421220E-03	2.7176355E-02	2.7176355E-02	1.2744583E-03	1.3411255E-02	1.7092086E-05	3.3047655E-02
49000.	9.6365027E-03	2.7187674E-02	2.7187674E-02	1.2347674E-03	1.3846901E-02	1.7097701E-05	3.3054537E-02
49250.	9.3444532E-03	2.7195862E-02	2.7195862E-02	1.1986240E-03	1.4252440E-02	1.7083316E-05	3.3036908E-02
49500.	9.0608503E-03	2.7212908E-02	2.7212908E-02	1.1635643E-03	1.4668753E-02	1.7068039E-05	3.3018185E-02
49750.	8.7854533E-03	2.7095394E-02	2.7095394E-02	1.1295526E-03	1.5096144E-02	1.7051889E-05	3.2998393E-02
50000.	8.5180215E-03	2.7061178E-02	2.7061178E-02	1.0965534E-03	1.5534932E-02	1.7034883E-05	3.2977550E-02
50250.	8.2583286E-03	2.7025298E-02	2.7025298E-02	1.0645333E-03	1.5985440E-02	1.7017040E-05	3.2952881E-02
50500.	8.0061513E-03	2.6987793E-02	2.6987793E-02	1.0334612E-03	1.6448006E-02	1.6998277E-05	3.2923805E-02
50750.	7.7612761E-03	2.6948649E-02	2.6948649E-02	1.0033052E-03	1.6922295E-02	1.6978910E-05	3.2908944E-02
51000.	7.5234920E-03	2.6908057E-02	2.6908057E-02	9.7403572E-04	1.7410715E-02	1.6958658E-05	3.2884119E-02
51250.	7.2925984E-03	2.6865905E-02	2.6865905E-02	9.4562420E-04	1.7911596E-02	1.6937638E-05	3.2858353E-02
51500.	7.0683973E-03	2.6822277E-02	2.6822277E-02	9.1804309E-04	1.8426005E-02	1.6915866E-05	3.2831662E-02
51750.	6.8506990E-03	2.6777211E-02	2.6777211E-02	8.9126533E-04	1.8954342E-02	1.6893359E-05	3.2804069E-02
52000.	6.6393197E-03	2.6730745E-02	2.6730745E-02	8.6526723E-04	1.9497023E-02	1.6870136E-05	3.2775595E-02
52250.	6.4340792E-03	2.6682914E-02	2.6682914E-02	8.4002243E-04	2.0054474E-02	1.6846209E-05	3.2746258E-02
52500.	6.2348041E-03	2.6633759E-02	2.6633759E-02	8.1550777E-04	2.0627146E-02	1.6821598E-05	3.2716081E-02
52750.	6.0413253E-03	2.6583313E-02	2.6583313E-02	7.9110059E-04	2.1215500E-02	1.6796320E-05	3.2685084E-02
53000.	5.8534791E-03	2.6531610E-02	2.6531610E-02	7.6857846E-04	2.1820008E-02	1.6770388E-05	3.2653283E-02
53250.	5.6711084E-03	2.6478688E-02	2.6478688E-02	7.4612072E-04	2.2441168E-02	1.6743821E-05	3.2620700E-02
53500.	5.4945539E-03	2.6424584E-02	2.6424584E-02	7.2430671E-04	2.3079496E-02	1.6716634E-05	3.2587356E-02
53750.	5.3221716E-03	2.6369328E-02	2.6369328E-02	7.0311693E-04	2.3735514E-02	1.6688842E-05	3.2553267E-02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

	GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
	meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
	36000.	5.044044E-03	4.225175E-03	8.504716E-01	2.8964400E 01	1.0118340E 01	
	36250.	4.9218735E-03	5.2973186E-03	8.6167628E-01		1.0120091E 01	
	36500.	4.799939E-03	5.7001666E-03	8.6320131E-01		1.0121770E 01	
	36750.	4.5960367E-03	5.5713696E-03	8.6509210E-01		1.0123409E 01	
	37000.	4.4410980E-03	5.3705889E-03	8.6690596E-01		1.0124972E 01	
	37250.	4.2933116E-03	5.1775097E-03	8.6872227E-01		1.0126403E 01	
	37500.	4.1500691E-03	4.9918207E-03	8.7054015E-01		1.0127960E 01	
	37750.	4.0110641E-03	4.8132402E-03	8.7235807E-01		1.0129349E 01	
	38000.	3.8788020E-03	4.6416896E-03	8.7417755E-01		1.0130699E 01	
	38250.	3.7503962E-03	4.4762817E-03	8.7599536E-01		1.0132009E 01	
	38500.	3.6265643E-03	4.3179663E-03	8.7781137E-01		1.0133264E 01	
	38750.	3.5071320E-03	4.1644938E-03	8.7962642E-01		1.0134479E 01	
	39000.	3.3919357E-03	4.0174260E-03	8.8143409E-01		1.0135650E 01	
	39250.	3.2800122E-03	3.8759355E-03	8.8323800E-01		1.0136781E 01	
	39500.	3.1726099E-03	3.7398026E-03	8.8503755E-01		1.0137871E 01	
	39750.	3.0701783E-03	3.6088134E-03	8.8682930E-01		1.0138923E 01	
	40000.	2.9703779E-03	3.4827691E-03	8.8861302E-01		1.0139938E 01	
	40250.	2.8740708E-03	3.3614750E-03	8.9038732E-01		1.0140917E 01	
	40500.	2.7811256E-03	3.2447410E-03	8.9215099E-01		1.0141862E 01	
	40750.	2.6914170E-03	3.1323950E-03	8.9390275E-01		1.0142775E 01	
	41000.	2.6048221E-03	3.0242574E-03	8.9564131E-01		1.0143656E 01	
	41250.	2.5212255E-03	2.9201680E-03	8.9736534E-01		1.0144506E 01	
	41500.	2.4405145E-03	2.8199670E-03	8.9907334E-01		1.0145327E 01	
	41750.	2.3625819E-03	2.7235930E-03	9.0076380E-01		1.0146110E 01	
	42000.	2.2873230E-03	2.6306283E-03	9.0243558E-01		1.0146885E 01	
	42250.	2.2146380E-03	2.5412036E-03	9.0409066E-01		1.0147624E 01	
	42500.	2.1444333E-03	2.4550942E-03	9.0571612E-01		1.0148330E 01	
	42750.	2.0766138E-03	2.3721695E-03	9.0732185E-01		1.0149028E 01	
	43000.	2.0110933E-03	2.2923075E-03	9.0890229E-01		1.0149694E 01	
	43250.	1.9477835E-03	2.2153852E-03	9.1045582E-01		1.0150330E 01	
	43500.	1.8866602E-03	2.1412925E-03	9.1198649E-01		1.0150960E 01	
	43750.	1.8274791E-03	2.0699151E-03	9.1347519E-01		1.0151561E 01	
	44000.	1.7703296E-03	2.0011512E-03	9.1493738E-01		1.0152142E 01	
	44250.	1.7150819E-03	1.9348955E-03	9.1636553E-01		1.0152704E 01	
	44500.	1.6616672E-03	1.8710526E-03	9.1775768E-01		1.0153240E 01	
	44750.	1.6100180E-03	1.8095202E-03	9.1911191E-01		1.0153773E 01	
	45000.	1.5600692E-03	1.7502324E-03	9.2042631E-01		1.0154281E 01	
	45250.	1.5117585E-03	1.6930789E-03	9.2169876E-01		1.0154772E 01	
	45500.	1.4650259E-03	1.6379048E-03	9.2292717E-01		1.0155247E 01	
	45750.	1.4198133E-03	1.5848697E-03	9.2410953E-01		1.0155707E 01	
	46000.	1.3760647E-03	1.5336569E-03	9.2524362E-01		1.0156152E 01	
	46250.	1.3337285E-03	1.4842765E-03	9.2632723E-01		1.0156583E 01	
	46500.	1.2927508E-03	1.4366493E-03	9.2735821E-01		1.0157000E 01	
	46750.	1.2530856E-03	1.3907175E-03	9.2833408E-01		1.0157403E 01	
	47000.	1.2146813E-03	1.3464090E-03	9.2925265E-01		1.0157793E 01	
	47250.	1.1774943E-03	1.3036640E-03	9.3011150E-01		1.0158172E 01	
	47500.	1.1414802E-03	1.2624218E-03	9.3090819E-01		1.0158538E 01	
	47750.	1.1065970E-03	1.2226250E-03	9.3164015E-01		1.0158893E 01	
	48000.	1.0728034E-03	1.1842175E-03	9.3230493E-01		1.0159236E 01	
	48250.	1.0400607E-03	1.1471467E-03	9.3289990E-01		1.0159569E 01	
	48500.	1.0083307E-03	1.1113608E-03	9.3342245E-01		1.0159892E 01	
	48750.	9.7757896E-04	1.0768128E-03	9.3386976E-01		1.0160205E 01	
	49000.	9.4752835E-04	1.0432772E-03	9.3417690E-01		1.0160511E 01	
	49250.	9.1881199E-04	1.0127390E-03	9.3339058E-01		1.0160803E 01	
	49500.	8.9092617E-04	9.8311651E-04	9.3255587E-01		1.0161086E 01	
	49750.	8.6384722E-04	9.5437936E-04	9.3167360E-01		1.0161362E 01	
	50000.	8.3755145E-04	9.2649775E-04	9.3074435E-01		1.0161629E 01	
	50250.	8.1201663E-04	8.9944376E-04	9.2976943E-01		1.0161889E 01	
	50500.	7.8722080E-04	8.7319003E-04	9.2874972E-01		1.0162141E 01	
	50750.	7.6314294E-04	8.4771069E-04	9.2768611E-01		1.0162386E 01	
	51000.	7.3976235E-04	8.2298036E-04	9.2657958E-01		1.0162624E 01	
	51250.	7.1705927E-04	7.9897496E-04	9.2543113E-01		1.0162854E 01	
	51500.	6.9501426E-04	7.7567118E-04	9.2424155E-01		1.0163079E 01	
	51750.	6.7360863E-04	7.5304667E-04	9.2301184E-01		1.0163296E 01	
	52000.	6.5282634E-04	7.3107990E-04	9.2174293E-01		1.0163508E 01	
	52250.	6.3264366E-04	7.0975011E-04	9.2043562E-01		1.0163713E 01	
	52500.	6.1304954E-04	6.8903723E-04	9.1909096E-01		1.0163912E 01	
	52750.	5.9402935E-04	6.6892192E-04	9.1770933E-01		1.0164106E 01	
	53000.	5.7555500E-04	6.4938582E-04	9.1629300E-01		1.0164293E 01	
	53250.	5.5762286E-04	6.3041086E-04	9.1484161E-01		1.0164476E 01	
	53500.	5.4021380E-04	6.1197901E-04	9.1335599E-01		1.0164653E 01	
	53750.	5.2331313E-04	5.9407618E-04	9.1183751E-01	2.8964400E 01	1.0164825E 01	

MOLECULAR WEIGHT CONSTANT TO 90,000 METERS

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

**TABLE III**  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	VIRTUAL TEMPERATURE	DENSITY	KINEMATIC VISCOSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	m <sup>2</sup> sec <sup>-1</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
5000.	5.1558137E-03	2.6312956E 02	2.6312956E 02	6.8253221E-04	2.4409778E-02	1.6660460E-05	3.2518452E 02
5025.	4.9933376E-03	2.6755556E 02	2.6255506E 02	6.6253418E-04	2.5102866E-02	1.6631507E-05	3.2482934E 02
5050.	4.8361787E-03	2.6197010E 02	2.6197010E 02	6.4310530E-04	2.5815361E-02	1.6601996E-05	3.2446728E 02
5075.	4.6834927E-03	2.6137502E 02	2.6137502E 02	6.2422839E-04	2.6547884E-02	1.6571943E-05	3.2409855E 02
5100.	4.5353597E-03	2.6077015E 02	2.6077015E 02	6.0588697E-04	2.7301070E-02	1.6541363E-05	3.2372332E 02
5125.	4.3915860E-03	2.6015581E 02	2.6015581E 02	5.8806537E-04	2.8075549E-02	1.6510270E-05	3.2334178E 02
5150.	4.2520468E-03	2.5953237E 02	2.5953237E 02	5.7074782E-04	2.8872090E-02	1.6478682E-05	3.2295411E 02
5175.	4.1166255E-03	2.5890011E 02	2.5890011E 02	5.5391979E-04	2.9691323E-02	1.6446611E-05	3.2256049E 02
5200.	3.9852059E-03	2.5825934E 02	2.5825934E 02	5.376684E-04	3.0534011E-02	1.6414072E-05	3.2216108E 02
5225.	3.8576765E-03	2.5761243E 02	2.5761243E 02	5.2167510E-04	3.1400924E-02	1.6381081E-05	3.2175609E 02
5250.	3.7339278E-03	2.5695369E 02	2.5695369E 02	5.0623109E-04	3.2292805E-02	1.6347652E-05	3.2134569E 02
5275.	3.6138545E-03	2.5628940E 02	2.5628940E 02	4.9122195E-04	3.3210649E-02	1.6313800E-05	3.2093004E 02
5300.	3.4973535E-03	2.5561786E 02	2.5561786E 02	4.7663518E-04	3.4155129E-02	1.6279536E-05	3.2050931E 02
5325.	3.3843247E-03	2.5493941E 02	2.5493941E 02	4.6245854E-04	3.5127209E-02	1.6244878E-05	3.2008368E 02
5350.	3.2746712E-03	2.5425435E 02	2.5425435E 02	4.4868036E-04	3.6127810E-02	1.6209839E-05	3.1965336E 02
5375.	3.1682985E-03	2.5356290E 02	2.5356290E 02	4.3528944E-04	3.7157872E-02	1.6174430E-05	3.1921839E 02
5400.	3.0651143E-03	2.5286545E 02	2.5286545E 02	4.2227457E-04	3.8218422E-02	1.6138668E-05	3.1877907E 02
5425.	2.9650293E-03	2.5216226E 02	2.5216226E 02	4.0962520E-04	3.9310484E-02	1.6102565E-05	3.1833522E 02
5450.	2.8679566E-03	2.5145360E 02	2.5145360E 02	3.9733101E-04	4.0435140E-02	1.6066135E-05	3.1788789E 02
5475.	2.7738122E-03	2.5073975E 02	2.5073975E 02	3.8538216E-04	4.1593494E-02	1.6029391E-05	3.1743634E 02
5500.	2.6825136E-03	2.5002101E 02	2.5002101E 02	3.7376892E-04	4.2786719E-02	1.5992346E-05	3.1698105E 02
5525.	2.5929760E-03	2.4929760E 02	2.4929760E 02	3.6248189E-04	4.4016023E-02	1.5955011E-05	3.1652214E 02
5550.	2.5081352E-03	2.4856981E 02	2.4856981E 02	3.5151213E-04	4.5282651E-02	1.5917401E-05	3.1605979E 02
5575.	2.4249023E-03	2.4783793E 02	2.4783793E 02	3.4085073E-04	4.6567926E-02	1.5879529E-05	3.1559415E 02
5600.	2.3442082E-03	2.4710222E 02	2.4710222E 02	3.3048920E-04	4.7933204E-02	1.5841407E-05	3.1512538E 02
5625.	2.2659808E-03	2.4636295E 02	2.4636295E 02	3.2041923E-04	4.9319911E-02	1.5803048E-05	3.1465363E 02
5650.	2.1901511E-03	2.4562030E 02	2.4562030E 02	3.1063299E-04	5.0749477E-02	1.5764462E-05	3.1417902E 02
5675.	2.1166509E-03	2.4487455E 02	2.4487455E 02	3.0112260E-04	5.2223448E-02	1.5725661E-05	3.1370170E 02
5700.	2.0456141E-03	2.4412598E 02	2.4412598E 02	2.9188045E-04	5.3743437E-02	1.5686659E-05	3.1322185E 02
5725.	1.9763771E-03	2.4337476E 02	2.4337476E 02	2.8289940E-04	5.5311054E-02	1.5647464E-05	3.1273955E 02
5750.	1.9095769E-03	2.4262118E 02	2.4262118E 02	2.7417222E-04	5.6928059E-02	1.5608093E-05	3.1225500E 02
5775.	1.8446531E-03	2.4186543E 02	2.4186543E 02	2.6569211E-04	5.8596209E-02	1.5568551E-05	3.1176829E 02
5800.	1.7818466E-03	2.4110778E 02	2.4110778E 02	2.5745733E-04	6.0317397E-02	1.5528854E-05	3.1127960E 02
5825.	1.7209993E-03	2.4034843E 02	2.4034843E 02	2.4946634E-04	6.2093563E-02	1.5489012E-05	3.1078904E 02
5850.	1.6620553E-03	2.3958754E 02	2.3958754E 02	2.4166791E-04	6.3926700E-02	1.5449032E-05	3.1029671E 02
5875.	1.6049612E-03	2.3882540E 02	2.3882540E 02	2.3411097E-04	6.5818912E-02	1.5408929E-05	3.0980278E 02
5900.	1.5496626E-03	2.3806212E 02	2.3806212E 02	2.2676949E-04	6.7772384E-02	1.5368709E-05	3.0930732E 02
5925.	1.4961084E-03	2.3729799E 02	2.3729799E 02	2.1963763E-04	6.9789435E-02	1.5328366E-05	3.0881052E 02
5950.	1.4442482E-03	2.3653317E 02	2.3653317E 02	2.1270982E-04	7.1872414E-02	1.5287968E-05	3.0831246E 02
5975.	1.3940340E-03	2.3576784E 02	2.3576784E 02	2.0598070E-04	7.4023755E-02	1.5247465E-05	3.0781327E 02
6000.	1.3454170E-03	2.3500217E 02	2.3500217E 02	1.9944483E-04	7.6246075E-02	1.5206885E-05	3.0731304E 02
6025.	1.2983516E-03	2.3423638E 02	2.3423638E 02	1.9303979E-04	7.8542044E-02	1.5166240E-05	3.0681192E 02
6050.	1.2527926E-03	2.3347364E 02	2.3347364E 02	1.8693243E-04	8.0914448E-02	1.5125538E-05	3.0631001E 02
6075.	1.2086961E-03	2.3270509E 02	2.3270509E 02	1.8094601E-04	8.3366234E-02	1.5084787E-05	3.0580740E 02
6100.	1.1660196E-03	2.3193981E 02	2.3193981E 02	1.7513312E-04	8.5900316E-02	1.5043991E-05	3.0530415E 02
6125.	1.1247208E-03	2.3117513E 02	2.3117513E 02	1.6948893E-04	8.8520038E-02	1.5003167E-05	3.0480046E 02
6150.	1.0847607E-03	2.3041111E 02	2.3041111E 02	1.6400922E-04	9.1228521E-02	1.4962319E-05	3.0429636E 02
6175.	1.0460898E-03	2.2964788E 02	2.2964788E 02	1.5868995E-04	9.4029269E-02	1.4921453E-05	3.0379196E 02
6200.	1.0086976E-03	2.2888563E 02	2.2888563E 02	1.5352539E-04	9.6945850E-02	1.4880579E-05	3.0328736E 02
6225.	9.7251897E-04	2.2812446E 02	2.2812446E 02	1.4851282E-04	9.9922040E-02	1.4839735E-05	3.0278264E 02
6250.	9.3752730E-04	2.2736447E 02	2.2736447E 02	1.4364781E-04	1.0302162E-01	1.4798833E-05	3.0227787E 02
6275.	9.0368733E-04	2.2660580E 02	2.2660580E 02	1.3892644E-04	1.0622887E-01	1.4757972E-05	3.0177313E 02
6300.	8.7096431E-04	2.2584865E 02	2.2584865E 02	1.3434472E-04	1.0954754E-01	1.4717133E-05	3.0126856E 02
6325.	8.3932542E-04	2.2509302E 02	2.2509302E 02	1.2989902E-04	1.1298245E-01	1.4676317E-05	3.0076415E 02
6350.	8.0873778E-04	2.2433925E 02	2.2433925E 02	1.2558592E-04	1.1653808E-01	1.4635530E-05	3.0026000E 02
6375.	7.7916993E-04	2.2358690E 02	2.2358690E 02	1.2140136E-04	1.2021926E-01	1.4594782E-05	2.9975623E 02
6400.	7.5059128E-04	2.2283655E 02	2.2283655E 02	1.1734216E-04	1.2403084E-01	1.4554073E-05	2.9925283E 02
6425.	7.2297136E-04	2.2208419E 02	2.2208419E 02	1.1340511E-04	1.2797823E-01	1.4513411E-05	2.9874991E 02
6450.	6.9629181E-04	2.2134183E 02	2.2134183E 02	1.0958706E-04	1.3206667E-01	1.4472799E-05	2.9824749E 02
6475.	6.7049399E-04	2.2059755E 02	2.2059755E 02	1.0588440E-04	1.3630186E-01	1.4432251E-05	2.9774263E 02
6500.	6.4558010E-04	2.1985455E 02	2.1985455E 02	1.0229411E-04	1.4068898E-01	1.4391743E-05	2.9724439E 02
6525.	6.2151384E-04	2.1911562E 02	2.1911562E 02	9.8813258E-05	1.4523667E-01	1.4351309E-05	2.9674385E 02
6550.	5.9826390E-04	2.1837805E 02	2.1837805E 02	9.548879E-05	1.4994879E-01	1.4310941E-05	2.9624399E 02
6575.	5.7582031E-04	2.1764274E 02	2.1764274E 02	9.2168003E-05	1.5483280E-01	1.4270640E-05	2.9574485E 02
6600.	5.5414297E-04	2.1690924E 02	2.1690924E 02	8.8947983E-05	1.5989589E-01	1.4230412E-05	2.9524650E 02
6625.	5.3321321E-04	2.1617939E 02	2.1617939E 02	8.5925955E-05	1.6514514E-01	1.4190254E-05	2.9474890E 02
6650.	5.1303769E-04	2.1545138E 02	2.1545138E 02	8.2949228E-05	1.7058041E-01	1.4150177E-05	2.9425218E 02
6675.	4.9350380E-04	2.1472581E 02	2.1472581E 02	8.0065219E-05	1.7623349E-01	1.4110177E-05	2.9375629E 02
6700.	4.7467952E-04	2.1400271E 02	2.1400271E 02	7.7271433E-05	1.8208870E-01	1.4070255E-05	2.9326126E 02
6725.	4.5651352E-04	2.1328214E 02	2.1328214E 02	7.4563525E-05	1.8816272E-01	1.4030415E-05	2.9276712E 02
6750.	4.3898500E-04	2.1256401E 02	2.1256401E 02	7.1944517E-05	1.9444548E-01	1.3990693E-05	2.9227328E 02
6775.	4.2207370E-04	2.1184835E 02	2.1184835E 02	6.9406629E-05	2.0100344E-01	1.3950971E-05	2.9178139E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE
meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>
54000.	5.0690643E-04	5.7668378E-04	9.1028678E-01	2.8364400E-01	1.0164992E 01
54250.	4.9097988E-04	5.5978768E-04	9.0870489E-01		1.0165154E 01
54500.	4.7552003E-04	5.4337127E-04	9.0709243E-01		1.0165311E 01
54750.	4.6051775E-04	5.2742183E-04	9.0545042E-01		1.0165464E 01
55000.	4.4594829E-04	5.1192483E-04	9.0377960E-01		1.0165612E 01
55250.	4.3181145E-04	4.9686704E-04	9.0208077E-01		1.0165755E 01
55500.	4.1809098E-04	4.8223513E-04	9.0032490E-01		1.0165895E 01
55750.	4.0477541E-04	4.6801682E-04	8.9860260E-01		1.0166030E 01
56000.	3.9185332E-04	4.5419992E-04	8.9682474E-01		1.0166162E 01
56250.	3.7931373E-04	4.4077271E-04	8.9502219E-01		1.0166289E 01
56500.	3.6714590E-04	4.2772378E-04	8.9319574E-01		1.0166413E 01
56750.	3.5533945E-04	4.1504229E-04	8.9134611E-01		1.0166533E 01
57000.	3.4388426E-04	4.0271766E-04	8.8947403E-01		1.0166650E 01
57250.	3.3277048E-04	3.9073956E-04	8.8758039E-01		1.0166763E 01
57500.	3.2198857E-04	3.7909814E-04	8.8566595E-01		1.0166872E 01
57750.	3.1152927E-04	3.6778390E-04	8.8373126E-01		1.0166979E 01
58000.	3.0138347E-04	3.5678740E-04	8.8177731E-01		1.0167082E 01
58250.	2.9154242E-04	3.4609972E-04	8.7980474E-01		1.0167182E 01
58500.	2.8199755E-04	3.3571214E-04	8.7781430E-01		1.0167279E 01
58750.	2.7274061E-04	3.2561634E-04	8.7580649E-01		1.0167373E 01
59000.	2.6376350E-04	3.1580411E-04	8.7378269E-01		1.0167464E 01
59250.	2.5505827E-04	3.0626749E-04	8.7174278E-01		1.0167553E 01
59500.	2.4661739E-04	2.9699949E-04	8.6968786E-01		1.0167639E 01
59750.	2.3843336E-04	2.8799093E-04	8.6761861E-01		1.0167722E 01
60000.	2.3049894E-04	2.7923629E-04	8.6553571E-01		1.0167803E 01
60250.	2.2280707E-04	2.7072799E-04	8.6343989E-01		1.0167881E 01
60500.	2.1535097E-04	2.6245942E-04	8.6133162E-01		1.0167957E 01
60750.	2.0812393E-04	2.5442392E-04	8.5921162E-01		1.0168030E 01
61000.	2.0111943E-04	2.4661506E-04	8.5708065E-01		1.0168101E 01
61250.	1.9433122E-04	2.3902681E-04	8.5493916E-01		1.0168171E 01
61500.	1.8775312E-04	2.3165306E-04	8.5278798E-01		1.0168238E 01
61750.	1.8137920E-04	2.2448806E-04	8.5062753E-01		1.0168302E 01
62000.	1.7520362E-04	2.1752612E-04	8.4845861E-01		1.0168365E 01
62250.	1.6922068E-04	2.1076172E-04	8.4628174E-01		1.0168426E 01
62500.	1.6342490E-04	2.0418957E-04	8.4409732E-01		1.0168485E 01
62750.	1.5781101E-04	1.9780458E-04	8.4190620E-01		1.0168542E 01
63000.	1.5237367E-04	1.9160163E-04	8.3970866E-01		1.0168597E 01
63250.	1.4710784E-04	1.8557580E-04	8.3750552E-01		1.0168651E 01
63500.	1.4200859E-04	1.7972236E-04	8.3529718E-01		1.0168703E 01
63750.	1.3707117E-04	1.7403681E-04	8.3308420E-01		1.0168753E 01
64000.	1.3229081E-04	1.6851453E-04	8.3086702E-01		1.0168802E 01
64250.	1.2766301E-04	1.6315121E-04	8.2864624E-01		1.0168849E 01
64500.	1.2318333E-04	1.5794259E-04	8.2642241E-01		1.0168894E 01
64750.	1.1884746E-04	1.5288455E-04	8.2419587E-01		1.0168938E 01
65000.	1.1465120E-04	1.4797314E-04	8.2196886E-01		1.0168981E 01
65250.	1.1059041E-04	1.4320426E-04	8.1973635E-01		1.0169022E 01
65500.	1.0666126E-04	1.3857435E-04	8.1750449E-01		1.0169062E 01
65750.	1.0285976E-04	1.3407958E-04	8.1527168E-01		1.0169101E 01
66000.	9.9182203E-05	1.2971638E-04	8.1303844E-01		1.0169138E 01
66250.	9.5625859E-05	1.2548116E-04	8.1080512E-01		1.0169174E 01
66500.	9.2184241E-05	1.2137064E-04	8.0857201E-01		1.0169210E 01
66750.	8.8856859E-05	1.1738146E-04	8.0633949E-01		1.0169243E 01
67000.	8.5679302E-05	1.1351028E-04	8.0410815E-01		1.0169276E 01
67250.	8.2528344E-05	1.0975408E-04	8.0187805E-01		1.0169308E 01
67500.	7.9520754E-05	1.0610972E-04	7.9964927E-01		1.0169338E 01
67750.	7.6613433E-05	1.0257420E-04	7.9742320E-01		1.0169368E 01
68000.	7.3803384E-05	9.9144681E-05	7.9519892E-01		1.0169396E 01
68250.	7.1087601E-05	9.5818192E-05	7.9297726E-01		1.0169424E 01
68500.	6.8463247E-05	9.2592089E-05	7.9075834E-01		1.0169451E 01
68750.	6.5927658E-05	8.9463626E-05	7.8855235E-01		1.0169477E 01
69000.	6.3477950E-05	8.6430142E-05	7.8632962E-01		1.0169501E 01
69250.	6.1111588E-05	8.3489105E-05	7.8412042E-01		1.0169525E 01
69500.	5.8826000E-05	8.0638031E-05	7.8191479E-01		1.0169549E 01
69750.	5.6616880E-05	7.7874460E-05	7.7971284E-01		1.0169571E 01
70000.	5.4487127E-05	7.5196082E-05	7.7751489E-01		1.0169593E 01
70250.	5.2429252E-05	7.2600390E-05	7.7532077E-01		1.0169614E 01
70500.	5.0442504E-05	7.0084300E-05	7.7313105E-01		1.0169634E 01
70750.	4.8524745E-05	6.7648565E-05	7.7094553E-01		1.0169654E 01
71000.	4.6673810E-05	6.5288028E-05	7.6876431E-01		1.0169672E 01
71250.	4.4887602E-05	6.3001988E-05	7.6658753E-01		1.0169691E 01
71500.	4.3164976E-05	6.0787221E-05	7.6441507E-01		1.0169708E 01
71750.	4.1501238E-05	5.8642914E-05	7.6224694E-01	2.8964400E-01	1.0169725E 01

MOLECULAR WEIGHT CONSTANT TO 90,000 METERS

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	VIRTUAL TEMPERATURE	DENSITY	KINEMATIC VISCOSITY	COEFFICIENT OF FRICTION	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	m <sup>2</sup> sec <sup>-1</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
72000.	4.0576303E-04	2.1113518E 02	2.1113518E 02	6.6949356E-05	2.0778947E-01	1.3911371E-05	2.9128999E 02
72250.	3.9002491E-04	2.1042441E 02	2.1042441E 02	6.4570475E-05	2.1483266E-01	1.3871847E-05	2.9079913E 02
72500.	3.7484991E-04	2.0971612E 02	2.0971612E 02	6.2267774E-05	2.2214388E-01	1.3832605E-05	2.9030931E 02
72750.	3.6021682E-04	2.0901017E 02	2.0901017E 02	6.0039119E-05	2.2973417E-01	1.3793037E-05	2.8982028E 02
73000.	3.4610846E-04	2.0830656E 02	2.0830656E 02	5.7882463E-05	2.3761504E-01	1.3753744E-05	2.8933204E 02
73250.	3.3250751E-04	2.0760531E 02	2.0760531E 02	5.5795702E-05	2.4579899E-01	1.3714527E-05	2.8884462E 02
73500.	3.1939768E-04	2.0690623E 02	2.0690623E 02	5.3776921E-05	2.5429823E-01	1.3675376E-05	2.8835789E 02
73750.	3.0676283E-04	2.0620942E 02	2.0620942E 02	5.1824119E-05	2.6312645E-01	1.3636297E-05	2.8787192E 02
74000.	2.9458748E-04	2.0551462E 02	2.0551462E 02	4.9935490E-05	2.7229680E-01	1.3597275E-05	2.8738653E 02
74250.	2.8285647E-04	2.0482191E 02	2.0482191E 02	4.8109125E-05	2.8182420E-01	1.3558316E-05	2.8690179E 02
74500.	2.715515E-04	2.0413113E 02	2.0413113E 02	4.6343256E-05	2.9172336E-01	1.3519410E-05	2.8641758E 02
74750.	2.6066926E-04	2.0344220E 02	2.0344220E 02	4.4636129E-05	3.0200992E-01	1.3480554E-05	2.8593385E 02
75000.	2.5018505E-04	2.0275499E 02	2.0275499E 02	4.2986051E-05	3.1270005E-01	1.3441740E-05	2.8545051E 02
75250.	2.4008915E-04	2.0206947E 02	2.0206947E 02	4.1391349E-05	3.2381085E-01	1.3402968E-05	2.8496755E 02
75500.	2.3036834E-04	2.0138545E 02	2.0138545E 02	3.9850378E-05	3.3536007E-01	1.3364226E-05	2.8448462E 02
75750.	2.2101015E-04	2.0070282E 02	2.0070282E 02	3.8361580E-05	3.4736598E-01	1.3325508E-05	2.8400225E 02
76000.	2.1200230E-04	2.0002147E 02	2.0002147E 02	3.6923403E-05	3.5984789E-01	1.3286809E-05	2.8351977E 02
76250.	2.0333298E-04	1.9934132E 02	1.9934132E 02	3.5534339E-05	3.7282595E-01	1.3248124E-05	2.8303733E 02
76500.	1.9499040E-04	1.9866205E 02	1.9866205E 02	3.4192910E-05	3.8632084E-01	1.3209434E-05	2.8255468E 02
76750.	1.8696371E-04	1.9798364E 02	1.9798364E 02	3.2897717E-05	4.0035419E-01	1.3170739E-05	2.8207183E 02
77000.	1.7924187E-04	1.9730592E 02	1.9730592E 02	3.1647331E-05	4.1494902E-01	1.3132029E-05	2.8158863E 02
77250.	1.7181453E-04	1.9662865E 02	1.9662865E 02	3.0440435E-05	4.3012822E-01	1.3093290E-05	2.8110492E 02
77500.	1.6466712E-04	1.9595169E 02	1.9595169E 02	2.9275652E-05	4.4591716E-01	1.3054515E-05	2.8062060E 02
77750.	1.5780237E-04	1.9527487E 02	1.9527487E 02	2.8151717E-05	4.6234101E-01	1.3015694E-05	2.8013555E 02
78000.	1.5119831E-04	1.9459798E 02	1.9459798E 02	2.7067389E-05	4.7942609E-01	1.2976813E-05	2.7964961E 02
78250.	1.4484968E-04	1.9392081E 02	1.9392081E 02	2.6021414E-05	4.9720054E-01	1.2937861E-05	2.7916261E 02
78500.	1.3874759E-04	1.9324316E 02	1.9324316E 02	2.5012613E-05	5.1569290E-01	1.2898827E-05	2.7867443E 02
78750.	1.3288332E-04	1.9256477E 02	1.9256477E 02	2.4039828E-05	5.3493286E-01	1.2859495E-05	2.7818485E 02
79000.	1.2724843E-04	1.9188547E 02	1.9188547E 02	2.3101922E-05	5.5495180E-01	1.2820453E-05	2.7769374E 02
79250.	1.2183471E-04	1.9120492E 02	1.9120492E 02	2.2197789E-05	5.7578186E-01	1.2781088E-05	2.7720087E 02
79500.	1.1663428E-04	1.9052299E 02	1.9052299E 02	2.1326351E-05	5.9745705E-01	1.2741579E-05	2.7670611E 02
79750.	1.1163954E-04	1.8983932E 02	1.8983932E 02	2.0486587E-05	6.2001130E-01	1.2701915E-05	2.7620920E 02
80000.	1.0684305E-04	1.8915372E 02	1.8915372E 02	1.9677466E-05	6.4348133E-01	1.2662082E-05	2.7570998E 02
80250.	1.0223758E-04	1.8846591E 02	1.8846591E 02	1.8897985E-05	6.6790522E-01	1.2622063E-05	2.7520824E 02
80500.	9.7816271E-05	1.8777551E 02	1.8777551E 02	1.8147211E-05	6.9332055E-01	1.2581835E-05	2.7470371E 02
80750.	9.3572375E-05	1.8708234E 02	1.8708234E 02	1.7424191E-05	7.1976859E-01	1.2541385E-05	2.7419621E 02
81000.	8.9499401E-05	1.8638606E 02	1.8638606E 02	1.6728017E-05	7.4729094E-01	1.2500695E-05	2.7368549E 02
81250.	8.5591011E-05	1.8568842E 02	1.8568842E 02	1.6057795E-05	7.7593164E-01	1.2459747E-05	2.7317133E 02
81500.	8.1841182E-05	1.8498297E 02	1.8498297E 02	1.5422671E-05	8.0573518E-01	1.2418516E-05	2.7265341E 02
81750.	7.8244016E-05	1.8427542E 02	1.8427542E 02	1.4791815E-05	8.3674524E-01	1.2376981E-05	2.7213146E 02
82000.	7.4793850E-05	1.8356358E 02	1.8356358E 02	1.4194402E-05	8.6901376E-01	1.2335131E-05	2.7160535E 02
82250.	7.1485156E-05	1.8284694E 02	1.8284694E 02	1.3619450E-05	9.0258818E-01	1.2292935E-05	2.7107464E 02
82500.	6.8312650E-05	1.8212515E 02	1.8212515E 02	1.3066791E-05	9.3751932E-01	1.2250370E-05	2.7053908E 02
82750.	6.5272124E-05	1.8139796E 02	1.8139796E 02	1.2535078E-05	9.7386087E-01	1.2207420E-05	2.6999844E 02
83000.	6.2355813E-05	1.8066486E 02	1.8066486E 02	1.2023779E-05	1.0116662E 00	1.2164052E-05	2.6945229E 02
83250.	5.9552895E-05	1.8065000E 02	1.8065000E 02	1.1484251E-05	1.0591178E 00	1.2163172E-05	2.6944122E 02
83500.	5.6875955E-05	1.8065000E 02	1.8065000E 02	1.0968027E-05	1.1089663E 00	1.2163172E-05	2.6944122E 02
83750.	5.4319543E-05	1.8065000E 02	1.8065000E 02	1.0475044E-05	1.1611571E 00	1.2163172E-05	2.6944122E 02
84000.	5.1878215E-05	1.8065000E 02	1.8065000E 02	1.0004256E-05	1.2157997E 00	1.2163172E-05	2.6944122E 02
84250.	4.9546789E-05	1.8065000E 02	1.8065000E 02	9.556614E-06	1.2730092E 00	1.2163172E-05	2.6944122E 02
84500.	4.7320307E-05	1.8065000E 02	1.8065000E 02	9.1253040E-06	1.3329060E 00	1.2163172E-05	2.6944122E 02
84750.	4.5194038E-05	1.8065000E 02	1.8065000E 02	8.7152717E-06	1.3956160E 00	1.2163172E-05	2.6944122E 02
85000.	4.3163465E-05	1.8065000E 02	1.8065000E 02	8.3236936E-06	1.4612710E 00	1.2163172E-05	2.6944122E 02
85250.	4.1224272E-05	1.8065000E 02	1.8065000E 02	7.9497374E-06	1.5300093E 00	1.2163172E-05	2.6944122E 02
85500.	3.9372342E-05	1.8065000E 02	1.8065000E 02	7.5926090E-06	1.6019753E 00	1.2163172E-05	2.6944122E 02
85750.	3.7603741E-05	1.8065000E 02	1.8065000E 02	7.2515500E-06	1.6773203E 00	1.2163172E-05	2.6944122E 02
86000.	3.5914714E-05	1.8065000E 02	1.8065000E 02	6.9258360E-06	1.7562028E 00	1.2163172E-05	2.6944122E 02
86250.	3.4301675E-05	1.8065000E 02	1.8065000E 02	6.6147756E-06	1.8387883E 00	1.2163172E-05	2.6944122E 02
86500.	3.2761198E-05	1.8065000E 02	1.8065000E 02	6.3177043E-06	1.9252507E 00	1.2163172E-05	2.6944122E 02
86750.	3.1290016E-05	1.8065000E 02	1.8065000E 02	6.0340037E-06	2.0157714E 00	1.2163172E-05	2.6944122E 02
87000.	2.9885006E-05	1.8065000E 02	1.8065000E 02	5.7630599E-06	2.1105407E 00	1.2163172E-05	2.6944122E 02
87250.	2.8543187E-05	1.8065000E 02	1.8065000E 02	5.5043019E-06	2.2097574E 00	1.2163172E-05	2.6944122E 02
87500.	2.7261712E-05	1.8065000E 02	1.8065000E 02	5.2571808E-06	2.3136302E 00	1.2163172E-05	2.6944122E 02
87750.	2.6037863E-05	1.8065000E 02	1.8065000E 02	5.0211724E-06	2.4223769E 00	1.2163172E-05	2.6944122E 02
88000.	2.4869345E-05	1.8065000E 02	1.8065000E 02	4.7957760E-06	2.5362261E 00	1.2163172E-05	2.6944122E 02
88250.	2.3752779E-05	1.8065000E 02	1.8065000E 02	4.5805140E-06	2.6554185E 00	1.2163172E-05	2.6944122E 02
88500.	2.2686698E-05	1.8065000E 02	1.8065000E 02	4.3749296E-06	2.7801984E 00	1.2163172E-05	2.6944122E 02
88750.	2.1668942E-05	1.8065000E 02	1.8065000E 02	4.1782873E-06	2.9108339E 00	1.2163172E-05	2.6944122E 02
89000.	2.0696155E-05	1.8065000E 02	1.8065000E 02	3.9910710E-06	3.0475960E 00	1.2163172E-05	2.6944122E 02
89250.	1.9767475E-05	1.8065000E 02	1.8065000E 02	3.8119832E-06	3.1907728E 00	1.2163172E-05	2.6944122E 02
89500.	1.8880533E-05	1.8065000E 02	1.8065000E 02	3.6409443E-06	3.3403642E 00	1.2163172E-05	2.6944122E 02
89750.	1.8033452E-05	1.8065000E 02	1.8065000E 02	3.4779922E-06	3.4975844E 00	1.2163172E-05	2.6944122E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
72000.	3.9897164E-05	5.6566718E-05	7.6008329E-01	2.8964400E 01	1.0169741E 01	
72250.	3.8349976E-05	5.4556759E-05	7.5792378E-01		1.0169757E 01	
72500.	3.6851465E-05	5.2611166E-05	7.5576879E-01		1.0169772E 01	
72750.	3.541437E-05	5.0728135E-05	7.5361782E-01		1.0169787E 01	
73000.	3.4023190E-05	4.8905938E-05	7.5147093E-01		1.0169801E 01	
73250.	3.2694463E-05	4.7142795E-05	7.4932821E-01		1.0169815E 01	
73500.	3.1405413E-05	4.5437091E-05	7.4718099E-01		1.0169828E 01	
73750.	3.0163064E-05	4.3787133E-05	7.4505390E-01		1.0169840E 01	
74000.	2.8965901E-05	4.2191396E-05	7.4292182E-01		1.0169852E 01	
74250.	2.7812427E-05	4.0648267E-05	7.4079321E-01		1.0169864E 01	
74500.	2.6701201E-05	3.9156253E-05	7.3866751E-01		1.0169875E 01	
74750.	2.5630825E-05	3.7713871E-05	7.3654550E-01		1.0169886E 01	
75000.	2.4599945E-05	3.6319690E-05	7.3442382E-01		1.0169897E 01	
75250.	2.3607244E-05	3.4972298E-05	7.3230540E-01		1.0169907E 01	
75500.	2.2651426E-05	3.3670304E-05	7.3018862E-01		1.0169917E 01	
75750.	2.1731263E-05	3.2412392E-05	7.2807317E-01		1.0169926E 01	
76000.	2.0845549E-05	3.1197249E-05	7.2595872E-01		1.0169935E 01	
76250.	1.9993120E-05	3.0023604E-05	7.2384508E-01		1.0169944E 01	
76500.	1.9172819E-05	2.8890207E-05	7.2173114E-01		1.0169952E 01	
76750.	1.8383580E-05	2.7795974E-05	7.1961697E-01		1.0169960E 01	
77000.	1.7624314E-05	2.6739401E-05	7.1750195E-01		1.0169968E 01	
77250.	1.6894006E-05	2.5719673E-05	7.1538536E-01		1.0169975E 01	
77500.	1.6191631E-05	2.4735526E-05	7.1326679E-01		1.0169982E 01	
77750.	1.5516232E-05	2.3785894E-05	7.1114566E-01		1.0169989E 01	
78000.	1.4866875E-05	2.2864726E-05	7.0902130E-01		1.0169996E 01	
78250.	1.4242634E-05	2.1985962E-05	7.0689307E-01		1.0170002E 01	
78500.	1.3642633E-05	2.1133608E-05	7.0476035E-01		1.0170008E 01	
78750.	1.3064017E-05	2.0311685E-05	7.0262225E-01		1.0170014E 01	
79000.	1.2511956E-05	1.9519231E-05	7.0047820E-01		1.0170020E 01	
79250.	1.1979641E-05	1.8755312E-05	6.9832718E-01		1.0170025E 01	
79500.	1.1468298E-05	1.8019019E-05	6.9618077E-01		1.0170030E 01	
79750.	1.0977180E-05	1.7309487E-05	6.9403159E-01		1.0170035E 01	
80000.	1.0505556E-05	1.6625846E-05	6.9187519E-01		1.0170040E 01	
80250.	1.0052715E-05	1.5967249E-05	6.8973866E-01		1.0170045E 01	
80500.	9.6179799E-06	1.5332906E-05	6.8764068E-01		1.0170049E 01	
80750.	9.2006903E-06	1.4722013E-05	6.8552306E-01		1.0170054E 01	
81000.	8.8002070E-06	1.4133803E-05	6.8300741E-01		1.0170058E 01	
81250.	8.4159068E-06	1.3567517E-05	6.8077012E-01		1.0170061E 01	
81500.	8.0571972E-06	1.3022443E-05	6.7851731E-01		1.0170065E 01	
81750.	7.6934987E-06	1.2497872E-05	6.7624797E-01		1.0170069E 01	
82000.	7.3542544E-06	1.1993107E-05	6.7396140E-01		1.0170072E 01	
82250.	7.0289205E-06	1.1507488E-05	6.7165588E-01		1.0170076E 01	
82500.	6.7169775E-06	1.1040368E-05	6.6933023E-01		1.0170079E 01	
82750.	6.4179222E-06	1.0591113E-05	6.6698355E-01		1.0170082E 01	
83000.	6.1312594E-06	1.0159108E-05	6.6461403E-01		1.0170085E 01	
83250.	5.8556570E-06	9.7032506E-06	6.6456598E-01		1.0170088E 01	
83500.	5.5924417E-06	9.2670836E-06	6.6456598E-01		1.0170090E 01	
83750.	5.3410771E-06	8.8505540E-06	6.6456598E-01		1.0170093E 01	
84000.	5.1010289E-06	8.4527768E-06	6.6456598E-01		1.0170095E 01	
84250.	4.8717868E-06	8.0729058E-06	6.6456598E-01		1.0170098E 01	
84500.	4.6528635E-06	7.7101340E-06	6.6456598E-01		1.0170100E 01	
84750.	4.4437939E-06	7.3636903E-06	6.6456598E-01		1.0170102E 01	
85000.	4.2441337E-06	7.0328389E-06	6.6456598E-01		1.0170104E 01	
85250.	4.0534588E-06	6.7168766E-06	6.6456598E-01		1.0170106E 01	
85500.	3.8713640E-06	6.4151324E-06	6.6456598E-01		1.0170108E 01	
85750.	3.6974628E-06	6.1269654E-06	6.6456598E-01		1.0170109E 01	
86000.	3.5313858E-06	5.8517637E-06	6.6456598E-01		1.0170111E 01	
86250.	3.3727806E-06	5.5889432E-06	6.6456598E-01		1.0170113E 01	
86500.	3.2213101E-06	5.3379458E-06	6.6456598E-01		1.0170114E 01	
86750.	3.0766532E-06	5.0982386E-06	6.6456598E-01		1.0170116E 01	
87000.	2.9389028E-06	4.8693133E-06	6.6456598E-01		1.0170117E 01	
87250.	2.8065657E-06	4.6506840E-06	6.6456598E-01		1.0170119E 01	
87500.	2.6805622E-06	4.4418867E-06	6.6456598E-01		1.0170120E 01	
87750.	2.5602248E-06	4.2424792E-06	6.6456598E-01		1.0170121E 01	
88000.	2.4452984E-06	4.0520377E-06	6.6456598E-01		1.0170122E 01	
88250.	2.3355393E-06	3.8701589E-06	6.6456598E-01		1.0170123E 01	
88500.	2.2307148E-06	3.6964570E-06	6.6456598E-01		1.0170124E 01	
88750.	2.1308026E-06	3.5302638E-06	6.6456598E-01		1.0170125E 01	
89000.	2.0349907E-06	3.3721279E-06	6.6456598E-01		1.0170126E 01	
89250.	1.9436763E-06	3.2208134E-06	6.6456598E-01		1.0170127E 01	
89500.	1.8564660E-06	3.0762995E-06	6.6456598E-01		1.0170128E 01	
89750.	1.7731751E-06	2.9382804E-06	6.6456598E-01	2.8964400E 01	1.0170129E 01	

MOLECULAR WEIGHT CONSTANT TO 90,000 METERS

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	MOLECULAR TEMPERATURE	DENSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
90000.	1.7224435E-05	1.8065000E 02	1.8065000E 02	3.3215805E-06	1.2163172E-05	2.6944122E 02
91000.	1.4357534E-05	1.8359648E 02	1.8365000E 02	2.7234957E-06	1.2340215E-05	2.7166927E 02
92000.	1.2003841E-05	1.8654122E 02	1.8665000E 02	2.2404228E-06	1.2516126E-05	2.7387919E 02
93000.	1.0065252E-05	1.8948421E 02	1.8965000E 02	1.8488836E-06	1.2690921E-05	2.7607143E 02
94000.	8.4635721E-06	1.9242545E 02	1.9265000E 02	1.5304616E-06	1.2864614E-05	2.7824440E 02
95000.	7.1362419E-06	1.9536494E 02	1.9565000E 02	1.2706545E-06	1.3037217E-05	2.8040450E 02
96000.	6.0330423E-06	1.9830268E 02	1.9865000E 02	1.0579997E-06	1.3208747E-05	2.8254611E 02
97000.	5.1135173E-06	2.0123868E 02	2.0165000E 02	8.8340379E-07	1.3379216E-05	2.8467161E 02
98000.	4.3449711E-06	2.0417293E 02	2.0465000E 02	7.3962724E-07	1.3548638E-05	2.8678136E 02
99000.	3.7008921E-06	2.0710543E 02	2.0765000E 02	6.2088653E-07	1.3717028E-05	2.8887571E 02
100000.	3.1597170E-06	2.1003618E 02	2.1065000E 02	5.2254595E-07	1.3884397E-05	2.9095497E 02
101000.	2.7057645E-06	2.1478336E 02	2.1565000E 02	4.3709746E-07	1.4161117E-05	2.938778E 02
102000.	2.3253935E-06	2.1951949E 02	2.2065000E 02	3.6713880E-07	1.4435101E-05	2.9778102E 02
103000.	2.0053844E-06	2.2424457E 02	2.2565000E 02	3.0959355E-07	1.4706408E-05	3.0113603E 02
104000.	1.7351148E-06	2.2895861E 02	2.3065000E 02	2.6206711E-07	1.4975097E-05	3.0445407E 02
105000.	1.5060075E-06	2.3366159E 02	2.3565000E 02	2.2263706E-07	1.5241233E-05	3.0773633E 02
106000.	1.3111033E-06	2.3835333E 02	2.4065000E 02	1.8979684E-07	1.5504842E-05	3.1098395E 02
107000.	1.1447335E-06	2.4303442E 02	2.4565000E 02	1.6233933E-07	1.5766006E-05	3.1419801E 02
108000.	1.0022554E-06	2.4770427E 02	2.5065000E 02	1.3929915E-07	1.6024767E-05	3.1737952E 02
109000.	8.7985634E-07	2.5236306E 02	2.5565000E 02	1.1989573E-07	1.6281177E-05	3.2052946E 02
110000.	7.7438980E-07	2.5701081E 02	2.6065000E 02	1.0349983E-07	1.6535285E-05	3.2364874E 02
111000.	6.8403258E-07	2.6641334E 02	2.7065000E 02	8.8045367E-08	1.7036783E-05	3.2979880E 02
112000.	6.0696757E-07	2.7578200E 02	2.8065000E 02	7.5342182E-08	1.7549632E-05	3.3583625E 02
113000.	5.4086384E-07	2.8511684E 02	2.9065000E 02	6.4826916E-08	1.8014180E-05	3.4176707E 02
114000.	4.8386073E-07	2.9441785E 02	3.0065000E 02	5.6065657E-08	1.8490756E-05	3.4759671E 02
115000.	4.3446125E-07	3.0368503E 02	3.1065000E 02	4.8721141E-08	1.8959675E-05	3.5333018E 02
116000.	3.9145232E-07	3.1291837E 02	3.2065000E 02	4.2529020E-08	1.9421230E-05	3.5897208E 02
117000.	3.5384426E-07	3.2211787E 02	3.3065000E 02	3.7280470E-08	1.9875702E-05	3.6452667E 02
118000.	3.2082435E-07	3.3128354E 02	3.4065000E 02	3.2809278E-08	2.0323355E-05	3.6997789E 02
119000.	2.9172114E-07	3.4041538E 02	3.5065000E 02	2.8982235E-08	2.0764441E-05	3.7538938E 02
120000.	2.6597710E-07	3.4951338E 02	3.6065000E 02	2.5691890E-08	2.1199197E-05	3.8070451E 02
121000.	2.4341101E-07	3.6839206E 02	3.8065000E 02	2.2276765E-08	2.2050607E-05	3.9111815E 02
122000.	2.2377934E-07	3.8721781E 02	4.0065000E 02	1.9457748E-08	2.2879253E-05	4.0126162E 02
123000.	2.0658102E-07	4.0599362E 02	4.2065000E 02	1.7108315E-08	2.3686639E-05	4.1115493E 02
124000.	1.9141913E-07	4.2471051E 02	4.4065000E 02	1.5133149E-08	2.4474125E-05	4.2081570E 02
125000.	1.7797572E-07	4.4337744E 02	4.6065000E 02	1.3459454E-08	2.5242944E-05	4.3025962E 02
126000.	1.6599345E-07	4.6199146E 02	4.8065000E 02	1.2030946E-08	2.5994216E-05	4.3950065E 02
127000.	1.5526215E-07	4.8055254E 02	5.0065000E 02	1.0803615E-08	2.6728963E-05	4.4855134E 02
128000.	1.4560872E-07	4.9906068E 02	5.2065000E 02	9.7426983E-09	2.7448117E-05	4.5742298E 02
129000.	1.3688945E-07	5.1751589E 02	5.4065000E 02	8.8204658E-09	2.8152533E-05	4.6612582E 02
130000.	1.2898417E-07	5.3591816E 02	5.6065000E 02	8.0146089E-09	2.8842997E-05	4.7466910E 02
131000.	1.2179175E-07	5.5426750E 02	5.8065000E 02	7.3070349E-09	2.9520227E-05	4.8306132E 02
132000.	1.1522653E-07	5.7256391E 02	6.0065000E 02	6.6829568E-09	3.0184890E-05	4.9131021E 02
133000.	1.0921551E-07	5.9080738E 02	6.2065000E 02	6.1302094E-09	3.0837601E-05	4.9942288E 02
134000.	1.0369626E-07	6.0899793E 02	6.4065000E 02	5.6387136E-09	3.1478926E-05	5.0740585E 02
135000.	9.8615005E-08	6.2713553E 02	6.6065000E 02	5.2000715E-09	3.2109396E-05	5.1526515E 02
136000.	9.3925204E-08	6.4522020E 02	6.8065000E 02	4.8072428E-09	3.2729499E-05	5.2300637E 02
137000.	8.9586503E-08	6.6325194E 02	7.0065000E 02	4.4542972E-09	3.3339691E-05	5.3063467E 02
138000.	8.5563661E-08	6.8123074E 02	7.2065000E 02	4.1362113E-09	3.3940406E-05	5.3815483E 02
139000.	8.1825829E-08	6.9915662E 02	7.4065000E 02	3.8487096E-09	3.4532020E-05	5.4557136E 02
140000.	7.8345911E-08	7.1702955E 02	7.6065000E 02	3.5881386E-09	3.5114925E-05	5.5288841E 02
141000.	7.5100009E-08	7.3484955E 02	7.8065000E 02	3.3513623E-09	3.5689461E-05	5.6010988E 02
142000.	7.2066944E-08	7.5261663E 02	8.0065000E 02	3.1356758E-09	3.6255956E-05	5.6723942E 02
143000.	6.9227957E-08	7.7033076E 02	8.2064999E 02	2.9387408E-09	3.6814717E-05	5.7428046E 02
144000.	6.6566336E-08	7.8799196E 02	8.4065000E 02	2.7585267E-09	3.7366033E-05	5.8123620E 02
145000.	6.4067172E-08	8.0560023E 02	8.6064999E 02	2.5932840E-09	3.7910175E-05	5.8810970E 02
146000.	6.1717079E-08	8.2315556E 02	8.8065000E 02	2.4414047E-09	3.8467399E-05	5.9490377E 02
147000.	5.9504086E-08	8.4065795E 02	9.0065000E 02	2.3015928E-09	3.8977947E-05	6.0162112E 02
148000.	5.7417393E-08	8.5810742E 02	9.2064999E 02	2.1726345E-09	3.9502050E-05	6.0826430E 02
149000.	5.5447274E-08	8.7550395E 02	9.4065000E 02	2.0534772E-09	4.0019922E-05	6.1483570E 02
150000.	5.3584943E-08	8.9284424E 02	9.6064999E 02	1.9431903E-09	4.0531768E-05	6.2133762E 02
151000.	5.1813260E-08	9.0590989E 02	9.7565000E 02	1.8500549E-09	4.0911817E-05	6.2616974E 02
152000.	5.0126367E-08	9.1894822E 02	9.9065000E 02	1.7627216E-09	4.1288666E-05	6.3096486E 02
153000.	4.8519017E-08	9.3195982E 02	1.0056500E 03	1.6807491E-09	4.1662388E-05	6.3572381E 02
154000.	4.6986357E-08	9.4494449E 02	1.0206500E 03	1.6037353E-09	4.2033057E-05	6.4044740E 02
155000.	4.5523880E-08	9.5790220E 02	1.0356500E 03	1.5313132E-09	4.2400743E-05	6.4513641E 02
156000.	4.4127423E-08	9.7083302E 02	1.0506500E 03	1.4631480E-09	4.2765514E-05	6.4979159E 02
157000.	4.2793123E-08	9.8373690E 02	1.0656500E 03	1.3989338E-09	4.3127434E-05	6.5441364E 02
158000.	4.1517377E-08	9.9661385E 02	1.0806500E 03	1.3383698E-09	4.3486465E-05	6.5900328E 02
159000.	4.0296879E-08	1.0094639E 03	1.0956500E 03	1.2812601E-09	4.3842970E-05	6.6356118E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
90000.	1.6936289E-06	2.864633E-06	6.4456598E-01	2.8964400E 01	1.0170130E 01	
91000.	1.4117332E-06	2.3011304E-06	6.7423916E-01	2.8922960E 01	1.0170133E 01	
92000.	1.1803016E-06	1.8929737E-06	6.8385054E-01	2.8947520E 01	1.0170135E 01	
93000.	9.8968600E-07	1.5621551E-06	6.9340090E-01	2.8939080E 01	1.0170137E 01	
94000.	8.3219761E-07	1.2931146E-06	7.0289101E-01	2.8930640E 01	1.0170139E 01	
95000.	7.0168521E-07	1.0735989E-06	7.1232164E-01	2.8922200E 01	1.0170140E 01	
96000.	5.9321091E-07	8.9392306E-07	7.2169362E-01	2.8913760E 01	1.0170141E 01	
97000.	5.0279678E-07	7.4660381E-07	7.3100764E-01	2.8905320E 01	1.0170142E 01	
98000.	4.2722794E-07	6.2492440E-07	7.4026446E-01	2.8896880E 01	1.0170143E 01	
99000.	3.6309759E-07	5.2459823E-07	7.4948484E-01	2.8888440E 01	1.0170143E 01	
100000.	3.1068547E-07	4.4150850E-07	7.5860950E-01	2.8880000E 01	1.0170144E 01	
101000.	2.6804969E-07	3.6931154E-07	7.7372877E-01	2.8868000E 01	1.0170144E 01	
102000.	2.2864895E-07	3.1020220E-07	7.8869860E-01	2.8861600E 01	1.0170145E 01	
103000.	1.9718942E-07	2.6158608E-07	8.0352218E-01	2.8854000E 01	1.0170145E 01	
104000.	1.7060862E-07	2.2142523E-07	8.1820267E-01	2.8847200E 01	1.0170145E 01	
105000.	1.4808119E-07	1.8811007E-07	8.3274316E-01	2.8840000E 01	1.0170145E 01	
106000.	1.2891690E-07	1.6036277E-07	8.4714662E-01	2.8833000E 01	1.0170146E 01	
107000.	1.1258220E-07	1.3716394E-07	8.6161597E-01	2.8826000E 01	1.0170146E 01	
108000.	9.8348763E-08	1.1769636E-07	8.7553400E-01	2.8819000E 01	1.0170146E 01	
109000.	8.6513629E-08	1.0130297E-07	8.8958368E-01	2.8812000E 01	1.0170146E 01	
110000.	7.615321E-08	8.7448876E-08	9.0344751E-01	2.8805000E 01	1.0170146E 01	
111000.	6.7258668E-08	7.4391119E-08	9.3084816E-01	2.8811000E 01	1.0170146E 01	
112000.	5.9681296E-08	6.3657969E-08	9.5777620E-01	2.8816200E 01	1.0170146E 01	
113000.	5.3181515E-08	5.4773431E-08	9.8425070E-01	2.8813000E 01	1.0170147E 01	
114000.	4.7576371E-08	4.7370884E-08	1.0102897E 00	2.8814000E 01	1.0170147E 01	
115000.	4.2719269E-08	4.1165371E-08	1.0359102E 00	2.8815000E 01	1.0170147E 01	
116000.	3.8490330E-08	3.5935337E-08	1.0611285E 00	2.8816000E 01	1.0170147E 01	
117000.	3.4792442E-08	3.1498941E-08	1.0859597E 00	2.8817000E 01	1.0170147E 01	
118000.	3.1545694E-08	2.7721151E-08	1.1106184E 00	2.8818000E 01	1.0170147E 01	
119000.	2.8684067E-08	2.4487613E-08	1.1345183E 00	2.8819000E 01	1.0170147E 01	
120000.	2.6152728E-08	2.1707542E-08	1.1582723E 00	2.8820000E 01	1.0170147E 01	
121000.	2.3933973E-08	1.8822041E-08	1.2047912E 00	2.8821000E 01	1.0170147E 01	
122000.	2.2003549E-08	1.6440203E-08	1.2500664E 00	2.8822000E 01	1.0170147E 01	
123000.	2.0312489E-08	1.4455124E-08	1.2941800E 00	2.8823000E 01	1.0170147E 01	
124000.	1.8821667E-08	1.2786271E-08	1.3372063E 00	2.8824000E 01	1.0170147E 01	
125000.	1.7499817E-08	1.1372135E-08	1.3792127E 00	2.8825000E 01	1.0170147E 01	
126000.	1.6321637E-08	1.0165163E-08	1.4202604E 00	2.8826000E 01	1.0170147E 01	
127000.	1.5266460E-08	9.1281695E-09	1.4604051E 00	2.8827000E 01	1.0170147E 01	
128000.	1.4317268E-08	8.2317816E-09	1.4996980E 00	2.8828000E 01	1.0170147E 01	
129000.	1.3459928E-08	7.4525707E-09	1.5381896E 00	2.8829000E 01	1.0170147E 01	
130000.	1.2682626E-08	6.7716876E-09	1.5759108E 00	2.8830000E 01	1.0170147E 01	
131000.	1.1975416E-08	6.1738456E-09	1.6129130E 00	2.8831000E 01	1.0170147E 01	
132000.	1.1329876E-08	5.6465508E-09	1.6492286E 00	2.8832000E 01	1.0170147E 01	
133000.	1.0738833E-08	5.1795245E-09	1.6848911E 00	2.8833000E 01	1.0170147E 01	
134000.	1.0196142E-08	4.7642509E-09	1.7199315E 00	2.8834000E 01	1.0170147E 01	
135000.	9.6965170E-09	4.3936341E-09	1.7543789E 00	2.8835000E 01	1.0170147E 01	
136000.	9.2353829E-09	4.0617262E-09	1.7882598E 00	2.8836000E 01	1.0170147E 01	
137000.	8.808771E-09	3.7635161E-09	1.8215992E 00	2.8837000E 01	1.0170147E 01	
138000.	8.4132175E-09	3.4947596E-09	1.8544204E 00	2.8838000E 01	1.0170147E 01	
139000.	8.0456877E-09	3.2518442E-09	1.8867451E 00	2.8839000E 01	1.0170147E 01	
140000.	7.7035178E-09	3.0316831E-09	1.9185936E 00	2.8840000E 01	1.0170147E 01	
141000.	7.3843582E-09	2.8316265E-09	1.9499849E 00	2.8841000E 01	1.0170147E 01	
142000.	7.0861259E-09	2.6493891E-09	1.9809368E 00	2.8842000E 01	1.0170147E 01	
143000.	6.8069769E-09	2.4829952E-09	2.0114661E 00	2.8843000E 01	1.0170147E 01	
144000.	6.5452677E-09	2.3307289E-09	2.0415886E 00	2.8844000E 01	1.0170147E 01	
145000.	6.2995325E-09	2.1910956E-09	2.0713192E 00	2.8845000E 01	1.0170147E 01	
146000.	6.0684548E-09	2.0627869E-09	2.1006718E 00	2.8846000E 01	1.0170147E 01	
147000.	5.8508579E-09	1.9446573E-09	2.1296597E 00	2.8847000E 01	1.0170147E 01	
148000.	5.6456797E-09	1.8356981E-09	2.1582954E 00	2.8848000E 01	1.0170147E 01	
149000.	5.4519637E-09	1.7350200E-09	2.1865906E 00	2.8849000E 01	1.0170147E 01	
150000.	5.2688464E-09	1.6418366E-09	2.2145567E 00	2.8850000E 01	1.0170147E 01	
151000.	5.0946420E-09	1.5631448E-09	2.2332216E 00	2.8851000E 01	1.0170147E 01	
152000.	4.9287749E-09	1.4893553E-09	2.2539117E 00	2.8852000E 01	1.0170147E 01	
153000.	4.7707291E-09	1.4200952E-09	2.2763309E 00	2.8853000E 01	1.0170147E 01	
154000.	4.6200272E-09	1.3550249E-09	2.2965834E 00	2.8854000E 01	1.0170147E 01	
155000.	4.4762262E-09	1.2938341E-09	2.3166729E 00	2.8855000E 01	1.0170147E 01	
156000.	4.3389168E-09	1.2362401E-09	2.3366031E 00	2.8856000E 01	1.0170147E 01	
157000.	4.2077191E-09	1.1819844E-09	2.3561775E 00	2.8857000E 01	1.0170147E 01	
158000.	4.0822789E-09	1.1308297E-09	2.3753995E 00	2.8858000E 01	1.0170147E 01	
159000.	3.9622708E-09	1.0825598E-09	2.3934726E 00	2.8859000E 01	1.0170147E 01	



# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	MOLECULAR TEMPERATURE	DENSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
160000.	3.912849E-08	1.0222870E 03	1.1106500E 03	1.2273083E-09	4.4196706E-05	6.6808798E 02
161000.	3.8006765E-08	1.0304854E 03	1.1206500E 03	1.1814862E-09	4.4431075E-05	6.7108889E 02
162000.	3.6927060E-08	1.0386659E 03	1.1306500E 03	1.1377695E-09	4.4664298E-05	6.7407643E 02
163000.	3.5887447E-08	1.0468284E 03	1.1406500E 03	1.0960438E-09	4.4896393E-05	6.7705080E 02
164000.	3.4886099E-08	1.0549730E 03	1.1506500E 03	1.0562018E-09	4.5127375E-05	6.8001215E 02
165000.	3.3921305E-08	1.0630997E 03	1.1606500E 03	1.0181436E-09	4.5357258E-05	6.8296066E 02
166000.	3.299141E-08	1.0712083E 03	1.1706500E 03	9.8177412E-10	4.5586058E-05	6.8589650E 02
167000.	3.2094881E-08	1.0792991E 03	1.1806500E 03	9.4700518E-10	4.5813789E-05	6.8881981E 02
168000.	3.1230234E-08	1.0873719E 03	1.1906500E 03	9.1375313E-10	4.6040565E-05	6.9173079E 02
169000.	3.0396090E-08	1.0954267E 03	1.2006500E 03	8.8194002E-10	4.6266100E-05	6.9462955E 02
170000.	2.9591111E-08	1.1034635E 03	1.2106500E 03	8.5149170E-10	4.6490709E-05	6.9751629E 02
171000.	2.8813069E-08	1.1086877E 03	1.2176500E 03	8.2433703E-10	4.6647331E-05	6.9952990E 02
172000.	2.8059993E-08	1.1138985E 03	1.2246500E 03	7.9820295E-10	4.6803460E-05	7.0153775E 02
173000.	2.7330945E-08	1.1190961E 03	1.2316500E 03	7.7304559E-10	4.6959102E-05	7.0353985E 02
174000.	2.6625029E-08	1.1242804E 03	1.2386500E 03	7.4882312E-10	4.7114260E-05	7.0553628E 02
175000.	2.5941384E-08	1.1294514E 03	1.2456500E 03	7.2549574E-10	4.7268939E-05	7.0752708E 02
176000.	2.5279174E-08	1.1346091E 03	1.2526500E 03	7.0302521E-10	4.7423143E-05	7.0951229E 02
177000.	2.4637622E-08	1.1397535E 03	1.2596500E 03	6.8137571E-10	4.7576877E-05	7.1149195E 02
178000.	2.4015958E-08	1.1448846E 03	1.2666500E 03	6.6051251E-10	4.7730144E-05	7.1346613E 02
179000.	2.3413469E-08	1.1500024E 03	1.2736500E 03	6.4040310E-10	4.7882948E-05	7.1543486E 02
180000.	2.2829452E-08	1.1551070E 03	1.2806500E 03	6.2101602E-10	4.8035293E-05	7.1739818E 02
181000.	2.2263246E-08	1.1601982E 03	1.2876500E 03	6.0232157E-10	4.8187184E-05	7.1935616E 02
182000.	2.1714210E-08	1.1652761E 03	1.2946500E 03	5.8429129E-10	4.8338625E-05	7.2130880E 02
183000.	2.1181733E-08	1.1703408E 03	1.3016500E 03	5.6689814E-10	4.8489619E-05	7.2325619E 02
184000.	2.0665225E-08	1.1753922E 03	1.3086500E 03	5.5011615E-10	4.8640170E-05	7.2519835E 02
185000.	2.0164124E-08	1.1804302E 03	1.3156500E 03	5.3392071E-10	4.8790280E-05	7.2713531E 02
186000.	1.9677896E-08	1.1854550E 03	1.3226500E 03	5.1828839E-10	4.8939956E-05	7.2906713E 02
187000.	1.9206311E-08	1.1904665E 03	1.3296500E 03	5.0319647E-10	4.9089199E-05	7.3099386E 02
188000.	1.8747980E-08	1.1954647E 03	1.3366500E 03	4.8862371E-10	4.9238014E-05	7.3291548E 02
189000.	1.8303317E-08	1.2004496E 03	1.3436500E 03	4.7454937E-10	4.9386404E-05	7.3483211E 02
190000.	1.7871564E-08	1.2054212E 03	1.3506500E 03	4.6095390E-10	4.9534373E-05	7.3674375E 02
191000.	1.7451910E-08	1.2085380E 03	1.3556500E 03	4.4846974E-10	4.9639808E-05	7.3810617E 02
192000.	1.7043719E-08	1.2116448E 03	1.3606500E 03	4.3637082E-10	4.9745032E-05	7.3946609E 02
193000.	1.6646644E-08	1.2147417E 03	1.3656500E 03	4.2464403E-10	4.9850045E-05	7.4082351E 02
194000.	1.6260338E-08	1.2178287E 03	1.3706500E 03	4.1327655E-10	4.9954849E-05	7.4217845E 02
195000.	1.5884471E-08	1.2209057E 03	1.3756500E 03	4.0225603E-10	5.0059444E-05	7.4353091E 02
196000.	1.5518716E-08	1.2239729E 03	1.3806500E 03	3.9157048E-10	5.0163831E-05	7.4488092E 02
197000.	1.5162775E-08	1.2270301E 03	1.3856500E 03	3.8120879E-10	5.0268014E-05	7.4622649E 02
198000.	1.4816337E-08	1.2300773E 03	1.3906500E 03	3.7115965E-10	5.0371991E-05	7.4757363E 02
199000.	1.4479118E-08	1.2331147E 03	1.3956500E 03	3.6141266E-10	5.0475764E-05	7.4891635E 02
200000.	1.4150844E-08	1.2361421E 03	1.4006500E 03	3.5195770E-10	5.0579335E-05	7.5025666E 02
201000.	1.3831239E-08	1.2391566E 03	1.4056500E 03	3.4278686E-10	5.0682705E-05	7.5159460E 02
202000.	1.3520045E-08	1.2421672E 03	1.4106500E 03	3.3388477E-10	5.0785874E-05	7.5293015E 02
203000.	1.3217012E-08	1.2451682E 03	1.4156500E 03	3.2524838E-10	5.0888844E-05	7.5426334E 02
204000.	1.2921892E-08	1.2481526E 03	1.4206500E 03	3.1686483E-10	5.0991617E-05	7.5559417E 02
205000.	1.2634456E-08	1.2511304E 03	1.4256500E 03	3.0873182E-10	5.1094193E-05	7.5692267E 02
206000.	1.2354471E-08	1.2540982E 03	1.4306500E 03	3.0083510E-10	5.1196572E-05	7.5824883E 02
207000.	1.2081722E-08	1.2570561E 03	1.4356500E 03	2.9316897E-10	5.1298757E-05	7.5957268E 02
208000.	1.1815994E-08	1.2600042E 03	1.4406500E 03	2.8572584E-10	5.1400748E-05	7.6089423E 02
209000.	1.1557080E-08	1.2629423E 03	1.4456500E 03	2.7847841E-10	5.1502547E-05	7.6221349E 02
210000.	1.1304783E-08	1.2658705E 03	1.4506500E 03	2.7147970E-10	5.1604154E-05	7.6353047E 02
211000.	1.1058912E-08	1.2687887E 03	1.4556500E 03	2.6466296E-10	5.1705571E-05	7.6484517E 02
212000.	1.0819280E-08	1.2716970E 03	1.4606500E 03	2.5804174E-10	5.1806798E-05	7.6615745E 02
213000.	1.0585704E-08	1.2745954E 03	1.4656500E 03	2.5160961E-10	5.1907837E-05	7.6746784E 02
214000.	1.0358013E-08	1.2774839E 03	1.4706500E 03	2.4536062E-10	5.2008680E-05	7.6877581E 02
215000.	1.0136038E-08	1.2803624E 03	1.4756500E 03	2.3928894E-10	5.2109353E-05	7.7008157E 02
216000.	9.9196129E-09	1.2832310E 03	1.4806500E 03	2.3338883E-10	5.2209833E-05	7.7138512E 02
217000.	9.7085841E-09	1.2860897E 03	1.4856500E 03	2.2765497E-10	5.2310127E-05	7.7268646E 02
218000.	9.5027955E-09	1.2889384E 03	1.4906500E 03	2.2208202E-10	5.2410240E-05	7.7398562E 02
219000.	9.3020988E-09	1.2917773E 03	1.4956500E 03	2.1664498E-10	5.2510169E-05	7.7528260E 02
220000.	9.1063540E-09	1.2946062E 03	1.5006500E 03	2.1139897E-10	5.2609917E-05	7.7657742E 02
221000.	8.9154168E-09	1.2974252E 03	1.5056500E 03	2.0627917E-10	5.2709484E-05	7.7787007E 02
222000.	8.7291573E-09	1.3002342E 03	1.5106500E 03	2.0130113E-10	5.2808871E-05	7.7916059E 02
223000.	8.5474434E-09	1.3030332E 03	1.5156500E 03	1.9646052E-10	5.2908080E-05	7.8044897E 02
224000.	8.3701468E-09	1.3058225E 03	1.5206500E 03	1.9175273E-10	5.3007112E-05	7.8173523E 02
225000.	8.1971492E-09	1.3086018E 03	1.5256500E 03	1.8717407E-10	5.3105966E-05	7.8301938E 02
226000.	8.0283282E-09	1.3113712E 03	1.5306500E 03	1.8272038E-10	5.3204644E-05	7.8430142E 02
227000.	7.8635709E-09	1.3141306E 03	1.5356500E 03	1.7838787E-10	5.3303148E-05	7.8558137E 02
228000.	7.7027657E-09	1.3168801E 03	1.5406500E 03	1.7417285E-10	5.3401677E-05	7.8685923E 02
229000.	7.5459984E-09	1.3196197E 03	1.5456500E 03	1.7007170E-10	5.3499934E-05	7.8813503E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

	GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
	meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
160000.	3.8573873E-09	1.0349730E-09	2.4147999E 00	2.6640000E 01	1.0170147E 01		
161000.	3.7370909E-09	9.9825902E-10	2.4276052E 00	2.6634000E 01	1.0170147E 01		
162000.	3.6309267E-09	9.6132199E-10	2.4403480E 00	2.6628000E 01	1.0170147E 01		
163000.	3.5287047E-09	9.2606717E-10	2.4530291E 00	2.6582000E 01	1.0170147E 01		
164000.	3.4302453E-09	8.9240400E-10	2.4656494E 00	2.6536000E 01	1.0170147E 01		
165000.	3.3353799E-09	8.6024789E-10	2.4782096E 00	2.6530000E 01	1.0170147E 01		
166000.	3.2439443E-09	8.2951044E-10	2.4907107E 00	2.6504000E 01	1.0170147E 01		
167000.	3.1557932E-09	8.0014176E-10	2.5031534E 00	2.6478000E 01	1.0170147E 01		
168000.	3.0707750E-09	7.7204451E-10	2.5155384E 00	2.6452000E 01	1.0170147E 01		
169000.	2.9887562E-09	7.4516704E-10	2.5278666E 00	2.6426000E 01	1.0170147E 01		
170000.	2.9096050E-09	7.1944070E-10	2.5401386E 00	2.6400000E 01	1.0170147E 01		
171000.	2.8331025E-09	6.9449723E-10	2.5484960E 00	2.6372500E 01	1.0170147E 01		
172000.	2.7590547E-09	6.7441608E-10	2.5572266E 00	2.6345000E 01	1.0170147E 01		
173000.	2.6873697E-09	6.5316017E-10	2.5657305E 00	2.6317500E 01	1.0170147E 01		
174000.	2.6179591E-09	6.3269417E-10	2.5742079E 00	2.6290000E 01	1.0170147E 01		
175000.	2.5507383E-09	6.1298444E-10	2.5826592E 00	2.6262500E 01	1.0170147E 01		
176000.	2.4856252E-09	5.9399869E-10	2.5910844E 00	2.6235000E 01	1.0170147E 01		
177000.	2.4225433E-09	5.7570843E-10	2.5994842E 00	2.6207500E 01	1.0170147E 01		
178000.	2.3614169E-09	5.5807893E-10	2.6078573E 00	2.6180000E 01	1.0170147E 01		
179000.	2.3021760E-09	5.4108813E-10	2.6162072E 00	2.6152500E 01	1.0170147E 01		
180000.	2.2447514E-09	5.2470765E-10	2.6245309E 00	2.6125000E 01	1.0170147E 01		
181000.	2.1890701E-09	5.0891236E-10	2.6328299E 00	2.6097500E 01	1.0170147E 01		
182000.	2.1350930E-09	4.9367825E-10	2.6411043E 00	2.6070000E 01	1.0170147E 01		
183000.	2.0827361E-09	4.7898246E-10	2.6493542E 00	2.6042500E 01	1.0170147E 01		
184000.	2.0319495E-09	4.6480306E-10	2.6575799E 00	2.6015000E 01	1.0170147E 01		
185000.	1.9826777E-09	4.5111924E-10	2.6657816E 00	2.5987500E 01	1.0170147E 01		
186000.	1.9348603E-09	4.3791121E-10	2.6739595E 00	2.5960000E 01	1.0170147E 01		
187000.	1.8884693E-09	4.2515978E-10	2.6821137E 00	2.5932500E 01	1.0170147E 01		
188000.	1.8434325E-09	4.1284699E-10	2.6902446E 00	2.5905000E 01	1.0170147E 01		
189000.	1.7997101E-09	4.0095532E-10	2.6983523E 00	2.5877500E 01	1.0170147E 01		
190000.	1.7572572E-09	3.8946827E-10	2.7064370E 00	2.5850000E 01	1.0170147E 01		
191000.	1.7159939E-09	3.7892017E-10	2.7121977E 00	2.5822499E 01	1.0170147E 01		
192000.	1.6758571E-09	3.6869758E-10	2.7179469E 00	2.5794999E 01	1.0170147E 01		
193000.	1.6368144E-09	3.5878990E-10	2.7236845E 00	2.5767499E 01	1.0170147E 01		
194000.	1.5988302E-09	3.4918481E-10	2.7294108E 00	2.5735000E 01	1.0170147E 01		
195000.	1.5618723E-09	3.3987328E-10	2.7351256E 00	2.5702499E 01	1.0170147E 01		
196000.	1.5259087E-09	3.3084497E-10	2.7408290E 00	2.5677499E 01	1.0170147E 01		
197000.	1.4909101E-09	3.2209018E-10	2.7465213E 00	2.5652499E 01	1.0170147E 01		
198000.	1.4568458E-09	3.1359948E-10	2.7522024E 00	2.5627000E 01	1.0170147E 01		
199000.	1.4236882E-09	3.0536427E-10	2.7578723E 00	2.5599124E 01	1.0170147E 01		
200000.	1.3914099E-09	2.9737541E-10	2.7635311E 00	2.5562499E 01	1.0170147E 01		
201000.	1.3599841E-09	2.8962311E-10	2.7691790E 00	2.5533749E 01	1.0170147E 01		
202000.	1.3293844E-09	2.8210527E-10	2.7748159E 00	2.5505000E 01	1.0170147E 01		
203000.	1.2995890E-09	2.7480822E-10	2.7804420E 00	2.5476249E 01	1.0170147E 01		
204000.	1.2705708E-09	2.6772650E-10	2.7860572E 00	2.5447499E 01	1.0170147E 01		
205000.	1.2423081E-09	2.6085308E-10	2.7916617E 00	2.5418749E 01	1.0170147E 01		
206000.	1.2147780E-09	2.5418100E-10	2.7972554E 00	2.5390000E 01	1.0170147E 01		
207000.	1.1879593E-09	2.4770375E-10	2.8028386E 00	2.5361249E 01	1.0170147E 01		
208000.	1.1618311E-09	2.4141492E-10	2.8084112E 00	2.5332499E 01	1.0170147E 01		
209000.	1.1363729E-09	2.3530833E-10	2.8139732E 00	2.5303749E 01	1.0170147E 01		
210000.	1.1115654E-09	2.2937809E-10	2.8195248E 00	2.5275000E 01	1.0170147E 01		
211000.	1.0873895E-09	2.2361851E-10	2.8250659E 00	2.5246249E 01	1.0170147E 01		
212000.	1.0638273E-09	2.1802512E-10	2.8305967E 00	2.5217499E 01	1.0170147E 01		
213000.	1.0408604E-09	2.1258950E-10	2.8361172E 00	2.5188749E 01	1.0170147E 01		
214000.	1.0184723E-09	2.0730962E-10	2.8416275E 00	2.5160000E 01	1.0170147E 01		
215000.	9.9644617E-10	2.0217955E-10	2.8471276E 00	2.5131250E 01	1.0170147E 01		
216000.	9.7536570E-10	1.9719443E-10	2.8526176E 00	2.5102499E 01	1.0170147E 01		
217000.	9.5461588E-10	1.9234979E-10	2.8580974E 00	2.5073749E 01	1.0170147E 01		
218000.	9.3438121E-10	1.8764111E-10	2.8635673E 00	2.5045000E 01	1.0170147E 01		
219000.	9.1464741E-10	1.8306416E-10	2.8690272E 00	2.5016250E 01	1.0170147E 01		
220000.	8.9540042E-10	1.7861481E-10	2.8744772E 00	2.4987499E 01	1.0170147E 01		
221000.	8.7662612E-10	1.7428899E-10	2.8799173E 00	2.4958749E 01	1.0170147E 01		
222000.	8.5831180E-10	1.7008296E-10	2.8853475E 00	2.4930000E 01	1.0170147E 01		
223000.	8.4044441E-10	1.6599225E-10	2.8907681E 00	2.4901250E 01	1.0170147E 01		
224000.	8.2301136E-10	1.6201534E-10	2.8961789E 00	2.4872499E 01	1.0170147E 01		
225000.	8.0600103E-10	1.5814675E-10	2.9015801E 00	2.4843749E 01	1.0170147E 01		
226000.	7.8940138E-10	1.5438374E-10	2.9069716E 00	2.4815000E 01	1.0170147E 01		
227000.	7.7320129E-10	1.5072313E-10	2.9123536E 00	2.4786250E 01	1.0170147E 01		
228000.	7.5738980E-10	1.4716170E-10	2.9177261E 00	2.4757499E 01	1.0170147E 01		
229000.	7.4197612E-10	1.4369662E-10	2.9230998E 00	2.4728749E 01	1.0170147E 01		

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	MOLECULAR TEMPERATURE	DENSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees F	degrees K	kg m <sup>-3</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
230000.	7.3925818E-09	1.3223493E 03	1.5506500E 03	1.6660106E-10	5.3597617E-05	7.8440877E 02
231000.	7.2428844E-09	1.3241963E 03	1.5546500E 03	1.6229931E-10	5.3675801E-05	7.9042627E 02
232000.	7.0966346E-09	1.3260353E 03	1.5586500E 03	1.5861403E-10	5.3754035E-05	7.9144247E 02
233000.	6.9537457E-09	1.3278662E 03	1.5626500E 03	1.5502254E-10	5.3832081E-05	7.9245737E 02
234000.	6.8141302E-09	1.3296990E 03	1.5666500E 03	1.5152218E-10	5.3910018E-05	7.9347096E 02
235000.	6.6777033E-09	1.3315039E 03	1.5706500E 03	1.4811037E-10	5.3987878E-05	7.9448327E 02
236000.	6.5443868E-09	1.3333106E 03	1.5746500E 03	1.4478470E-10	5.4065570E-05	7.9549429E 02
237000.	6.4140997E-09	1.3351093E 03	1.5786500E 03	1.4154273E-10	5.4143183E-05	7.9650403E 02
238000.	6.2867616E-09	1.3369000E 03	1.5826500E 03	1.3838208E-10	5.4220692E-05	7.9751249E 02
239000.	6.1623034E-09	1.3386826E 03	1.5866500E 03	1.3530079E-10	5.4298093E-05	7.9851967E 02
240000.	6.0406505E-09	1.3404572E 03	1.5906500E 03	1.3229604E-10	5.4375389E-05	7.9952559E 02
241000.	5.9217323E-09	1.3422237E 03	1.5946500E 03	1.2936630E-10	5.4452580E-05	8.0053023E 02
242000.	5.8054790E-09	1.3439822E 03	1.5986500E 03	1.2650929E-10	5.4529665E-05	8.0153363E 02
243000.	5.6918242E-09	1.3457326E 03	1.6026500E 03	1.2372303E-10	5.4606646E-05	8.0253576E 02
244000.	5.5807045E-09	1.3474750E 03	1.6066500E 03	1.2100561E-10	5.4683524E-05	8.0353667E 02
245000.	5.4720553E-09	1.3492094E 03	1.6106500E 03	1.1835512E-10	5.4760296E-05	8.0453628E 02
246000.	5.3658158E-09	1.3509356E 03	1.6146500E 03	1.1576975E-10	5.4836976E-05	8.0553468E 02
247000.	5.2619249E-09	1.3526538E 03	1.6186500E 03	1.1324771E-10	5.4913533E-05	8.0653186E 02
248000.	5.1603259E-09	1.3543640E 03	1.6226500E 03	1.1078731E-10	5.4989998E-05	8.0752779E 02
249000.	5.0609626E-09	1.3560662E 03	1.6266500E 03	1.0838689E-10	5.5066360E-05	8.0852250E 02
250000.	4.9637803E-09	1.3577603E 03	1.6306500E 03	1.0604484E-10	5.5142621E-05	8.0951596E 02
251000.	4.8687236E-09	1.3594463E 03	1.6346500E 03	1.0375955E-10	5.5218779E-05	8.1050824E 02
252000.	4.7757415E-09	1.3611243E 03	1.6386500E 03	1.0152953E-10	5.5294838E-05	8.1149930E 02
253000.	4.6847841E-09	1.3627942E 03	1.6426500E 03	9.9353300E-11	5.5370796E-05	8.1248914E 02
254000.	4.5958012E-09	1.3644561E 03	1.6466500E 03	9.7229418E-11	5.5446653E-05	8.1347779E 02
255000.	4.5087449E-09	1.3661100E 03	1.6506500E 03	9.5146492E-11	5.5522412E-05	8.1446522E 02
256000.	4.4235698E-09	1.3677588E 03	1.6546500E 03	9.3133194E-11	5.5598070E-05	8.1545147E 02
257000.	4.3402283E-09	1.3693935E 03	1.6586500E 03	9.1158165E-11	5.5673630E-05	8.1643633E 02
258000.	4.2586772E-09	1.3710232E 03	1.6626500E 03	8.9237154E-11	5.5749090E-05	8.1742039E 02
259000.	4.1788747E-09	1.3726449E 03	1.6666500E 03	8.7367945E-11	5.5824453E-05	8.1840308E 02
260000.	4.1007767E-09	1.3742585E 03	1.6706500E 03	8.5510293E-11	5.5899718E-05	8.1938457E 02
261000.	4.0243446E-09	1.3758640E 03	1.6746500E 03	8.3716075E-11	5.5974885E-05	8.2036492E 02
262000.	3.9495377E-09	1.3774615E 03	1.6786500E 03	8.1964134E-11	5.6049955E-05	8.2134407E 02
263000.	3.8763164E-09	1.3790510E 03	1.6826500E 03	8.0253351E-11	5.6124928E-05	8.2232206E 02
264000.	3.8046447E-09	1.3806324E 03	1.6866500E 03	7.8582690E-11	5.6199805E-05	8.2329890E 02
265000.	3.7344853E-09	1.3822056E 03	1.6906500E 03	7.6951092E-11	5.6274586E-05	8.2427458E 02
266000.	3.6658013E-09	1.3837711E 03	1.6946500E 03	7.5357311E-11	5.6349271E-05	8.2524910E 02
267000.	3.5985599E-09	1.3853283E 03	1.6986500E 03	7.3801059E-11	5.6423861E-05	8.2622247E 02
268000.	3.5327263E-09	1.3868776E 03	1.7026500E 03	7.2280703E-11	5.6498355E-05	8.2719469E 02
269000.	3.4682674E-09	1.3884187E 03	1.7066500E 03	7.0795534E-11	5.6572756E-05	8.2816577E 02
270000.	3.4051519E-09	1.3899518E 03	1.7106500E 03	6.9344688E-11	5.6647062E-05	8.2913573E 02
271000.	3.3433475E-09	1.3914769E 03	1.7146500E 03	6.7927213E-11	5.6721274E-05	8.3010454E 02
272000.	3.2820238E-09	1.3929939E 03	1.7186500E 03	6.6542312E-11	5.6795392E-05	8.3107224E 02
273000.	3.2223518E-09	1.3945029E 03	1.7226500E 03	6.5189155E-11	5.6869417E-05	8.3203880E 02
274000.	3.1655008E-09	1.3960038E 03	1.7266500E 03	6.3866904E-11	5.6943349E-05	8.3300422E 02
275000.	3.1086453E-09	1.3974967E 03	1.7306500E 03	6.2574823E-11	5.7017189E-05	8.3396854E 02
276000.	3.0529552E-09	1.3989815E 03	1.7346500E 03	6.1312119E-11	5.7090937E-05	8.3493176E 02
277000.	2.9980405E-09	1.4004583E 03	1.7386500E 03	6.0078065E-11	5.7164592E-05	8.3589386E 02
278000.	2.9444918E-09	1.4019270E 03	1.7426500E 03	5.8871938E-11	5.7238156E-05	8.3685485E 02
279000.	2.8926212E-09	1.4033877E 03	1.7466500E 03	5.7693040E-11	5.7311629E-05	8.3781472E 02
280000.	2.8413364E-09	1.4048403E 03	1.7506500E 03	5.6540688E-11	5.7385010E-05	8.3877352E 02
281000.	2.7910914E-09	1.4062849E 03	1.7546500E 03	5.5414231E-11	5.7458303E-05	8.3973122E 02
282000.	2.7418610E-09	1.4077214E 03	1.7586500E 03	5.4312999E-11	5.7531503E-05	8.4068781E 02
283000.	2.6936236E-09	1.4091499E 03	1.7626500E 03	5.3236388E-11	5.7604614E-05	8.4164335E 02
284000.	2.6463566E-09	1.4105704E 03	1.7666500E 03	5.2183788E-11	5.7677636E-05	8.4259777E 02
285000.	2.6000374E-09	1.4119828E 03	1.7706500E 03	5.1154591E-11	5.7750568E-05	8.4355112E 02
286000.	2.5546459E-09	1.4133871E 03	1.7746500E 03	5.0148246E-11	5.7823412E-05	8.4450340E 02
287000.	2.5101599E-09	1.4147834E 03	1.7786500E 03	4.9164162E-11	5.7896167E-05	8.4545461E 02
288000.	2.4665603E-09	1.4161716E 03	1.7826500E 03	4.8201817E-11	5.7968833E-05	8.4640476E 02
289000.	2.4238261E-09	1.4175518E 03	1.7866500E 03	4.7260654E-11	5.8041411E-05	8.4735382E 02
290000.	2.3819394E-09	1.4189240E 03	1.7906500E 03	4.6340187E-11	5.8113902E-05	8.4830183E 02
291000.	2.3408808E-09	1.4202881E 03	1.7946500E 03	4.5439891E-11	5.8186305E-05	8.4924878E 02
292000.	2.3006322E-09	1.4216441E 03	1.7986500E 03	4.4559293E-11	5.8258622E-05	8.5019467E 02
293000.	2.2611749E-09	1.4229921E 03	1.8026500E 03	4.3697893E-11	5.8330851E-05	8.5113952E 02
294000.	2.2224918E-09	1.4243321E 03	1.8066500E 03	4.2855237E-11	5.8402995E-05	8.5208313E 02
295000.	2.1845663E-09	1.4256640E 03	1.8106500E 03	4.2030879E-11	5.8475052E-05	8.5302607E 02
296000.	2.1473817E-09	1.4269878E 03	1.8146500E 03	4.1224380E-11	5.8547023E-05	8.5396777E 02
297000.	2.1109216E-09	1.4283036E 03	1.8186500E 03	4.0435306E-11	5.8618908E-05	8.5490845E 02
298000.	2.0751696E-09	1.4296114E 03	1.8226500E 03	3.9663230E-11	5.8690707E-05	8.5584810E 02
299000.	2.0401117E-09	1.4309111E 03	1.8266500E 03	3.8907771E-11	5.8762494E-05	8.5678670E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

	GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
	meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
230000.	7.2684034E-10	1.4032488E-10	2.4284427E 00	2.4700000E 01	1.0170147E 01		
231000.	7.1217104E-10	1.3712962E-10	2.9327188E 00	2.4670860E 01	1.0170147E 01		
232000.	6.9779074E-10	1.3401385E-10	2.9369890E 00	2.4641719E 01	1.0170147E 01		
233000.	6.8374090E-10	1.3098134E-10	2.9412532E 00	2.4612580E 01	1.0170147E 01		
234000.	6.7001294E-10	1.2802382E-10	2.9455113E 00	2.4583440E 01	1.0170147E 01		
235000.	6.5659848E-10	1.2514112E-10	2.9497639E 00	2.4554300E 01	1.0170147E 01		
236000.	6.4349898E-10	1.2233121E-10	2.9540105E 00	2.4525160E 01	1.0170147E 01		
237000.	6.3067907E-10	1.1959200E-10	2.9582511E 00	2.4496019E 01	1.0170147E 01		
238000.	6.1815837E-10	1.1692152E-10	2.9624860E 00	2.4466880E 01	1.0170147E 01		
239000.	6.0592077E-10	1.1431791E-10	2.9667150E 00	2.4437740E 01	1.0170147E 01		
240000.	5.9395900E-10	1.1177931E-10	2.9709383E 00	2.4408600E 01	1.0170147E 01		
241000.	5.8226613E-10	1.0920328E-10	2.9751598E 00	2.4379460E 01	1.0170147E 01		
242000.	5.7083530E-10	1.0668998E-10	2.9793673E 00	2.4350320E 01	1.0170147E 01		
243000.	5.5963994E-10	1.0423592E-10	2.9835736E 00	2.4321180E 01	1.0170147E 01		
244000.	5.4873389E-10	1.0223982E-10	2.9877740E 00	2.4292040E 01	1.0170147E 01		
245000.	5.3804075E-10	1.0000038E-10	2.9919667E 00	2.4262900E 01	1.0170147E 01		
246000.	5.2764045E-10	9.7815955E-11	2.9961577E 00	2.4233760E 01	1.0170147E 01		
247000.	5.1738924E-10	9.5685017E-11	3.0003411E 00	2.4204620E 01	1.0170147E 01		
248000.	5.0739933E-10	9.3606200E-11	3.0045190E 00	2.4175480E 01	1.0170147E 01		
249000.	4.9762924E-10	9.1578042E-11	3.0086912E 00	2.4146340E 01	1.0170147E 01		
250000.	4.8807356E-10	8.9599197E-11	3.0128579E 00	2.4117200E 01	1.0170147E 01		
251000.	4.7872695E-10	8.7668320E-11	3.0170190E 00	2.4088060E 01	1.0170147E 01		
252000.	4.6958430E-10	8.5784129E-11	3.0211747E 00	2.4058920E 01	1.0170147E 01		
253000.	4.6064073E-10	8.3945396E-11	3.0253249E 00	2.4029780E 01	1.0170147E 01		
254000.	4.5189131E-10	8.2150890E-11	3.0294695E 00	2.4000640E 01	1.0170147E 01		
255000.	4.4333133E-10	8.0399437E-11	3.0336088E 00	2.3971500E 01	1.0170147E 01		
256000.	4.3495632E-10	7.8689916E-11	3.0377425E 00	2.3942360E 01	1.0170147E 01		
257000.	4.2676740E-10	7.7021178E-11	3.0418710E 00	2.3913220E 01	1.0170147E 01		
258000.	4.1874292E-10	7.5392167E-11	3.0459939E 00	2.3884080E 01	1.0170147E 01		
259000.	4.1089618E-10	7.3801855E-11	3.0501116E 00	2.3854940E 01	1.0170147E 01		
260000.	4.0321704E-10	7.2259190E-11	3.0542238E 00	2.3825800E 01	1.0170147E 01		
261000.	3.9570171E-10	7.0733223E-11	3.0583308E 00	2.3796660E 01	1.0170147E 01		
262000.	3.8835617E-10	6.9229746E-11	3.0624324E 00	2.3767520E 01	1.0170147E 01		
263000.	3.8114653E-10	6.7807505E-11	3.0665288E 00	2.3738380E 01	1.0170147E 01		
264000.	3.7409928E-10	6.6395932E-11	3.0706199E 00	2.3709240E 01	1.0170147E 01		
265000.	3.6720071E-10	6.5017367E-11	3.0747057E 00	2.3680100E 01	1.0170147E 01		
266000.	3.6044722E-10	6.3670937E-11	3.0787863E 00	2.3650960E 01	1.0170147E 01		
267000.	3.5383558E-10	6.2355846E-11	3.0828618E 00	2.3621820E 01	1.0170147E 01		
268000.	3.4736236E-10	6.1071270E-11	3.0869319E 00	2.3592680E 01	1.0170147E 01		
269000.	3.4102430E-10	5.9816424E-11	3.0909970E 00	2.3563540E 01	1.0170147E 01		
270000.	3.3481835E-10	5.8590562E-11	3.0950569E 00	2.3534400E 01	1.0170147E 01		
271000.	3.2874131E-10	5.7392920E-11	3.0991116E 00	2.3505260E 01	1.0170147E 01		
272000.	3.2279020E-10	5.6222801E-11	3.1031613E 00	2.3476120E 01	1.0170147E 01		
273000.	3.1696215E-10	5.5079493E-11	3.1072059E 00	2.3446980E 01	1.0170147E 01		
274000.	3.1125417E-10	5.3962300E-11	3.1112453E 00	2.3417840E 01	1.0170147E 01		
275000.	3.0566371E-10	5.2870597E-11	3.1152798E 00	2.3388700E 01	1.0170147E 01		
276000.	3.0018791E-10	5.1803716E-11	3.1193091E 00	2.3359560E 01	1.0170147E 01		
277000.	2.9482418E-10	5.0761041E-11	3.1233335E 00	2.3330420E 01	1.0170147E 01		
278000.	2.8956996E-10	4.9741963E-11	3.1273528E 00	2.3301280E 01	1.0170147E 01		
279000.	2.8442274E-10	4.8745891E-11	3.1313672E 00	2.3272140E 01	1.0170147E 01		
280000.	2.7938007E-10	4.7772247E-11	3.1353766E 00	2.3243000E 01	1.0170147E 01		
281000.	2.7443963E-10	4.6820484E-11	3.1393811E 00	2.3213860E 01	1.0170147E 01		
282000.	2.6959895E-10	4.5890033E-11	3.1433806E 00	2.3184720E 01	1.0170147E 01		
283000.	2.6485591E-10	4.4980385E-11	3.1473752E 00	2.3155580E 01	1.0170147E 01		
284000.	2.6020879E-10	4.4091025E-11	3.1513649E 00	2.3126440E 01	1.0170147E 01		
285000.	2.5565366E-10	4.3221437E-11	3.1553498E 00	2.3097300E 01	1.0170147E 01		
286000.	2.5119065E-10	4.2371156E-11	3.1593298E 00	2.3068160E 01	1.0170147E 01		
287000.	2.4681647E-10	4.1539608E-11	3.1633049E 00	2.3039020E 01	1.0170147E 01		
288000.	2.4252946E-10	4.0726585E-11	3.1672752E 00	2.3009880E 01	1.0170147E 01		
289000.	2.3832753E-10	3.9931379E-11	3.1712407E 00	2.2980735E 01	1.0170147E 01		
290000.	2.3420894E-10	3.9153661E-11	3.1752014E 00	2.2951600E 01	1.0170147E 01		
291000.	2.3017177E-10	3.8392984E-11	3.1791574E 00	2.2922460E 01	1.0170147E 01		
292000.	2.2621425E-10	3.7648951E-11	3.1831086E 00	2.2893320E 01	1.0170147E 01		
293000.	2.2233453E-10	3.6921130E-11	3.1870950E 00	2.2864180E 01	1.0170147E 01		
294000.	2.1853094E-10	3.6209163E-11	3.1909960E 00	2.2835039E 01	1.0170147E 01		
295000.	2.1480184E-10	3.5517648E-11	3.1949338E 00	2.2805900E 01	1.0170147E 01		
296000.	2.1114559E-10	3.4831227E-11	3.1988661E 00	2.2776760E 01	1.0170147E 01		
297000.	2.0756057E-10	3.4164526E-11	3.2027937E 00	2.2747620E 01	1.0170147E 01		
298000.	2.0404519E-10	3.3512174E-11	3.2067167E 00	2.2718480E 01	1.0170147E 01		
299000.	2.0059805E-10	3.2873878E-11	3.2106355E 00	2.2689340E 01	1.0170147E 01		

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	MOLECULAR TEMPERATURE	DENSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
300000.	2.0557311E-09	1.4321902E 03	1.8306500E 03	3.8168505E-11	5.8834054E-05	8.5772430E 02
302000.	1.9388802E-09	1.4339023E 03	1.8372500E 03	3.6763628E-11	5.8952040E-05	8.5926904E 02
304000.	1.8744851E-09	1.4355909E 03	1.8438500E 03	3.5415564E-11	5.9069830E-05	8.6081107E 02
306000.	1.8123020E-09	1.4372541E 03	1.8504500E 03	3.4122362E-11	5.9187380E-05	8.6235031E 02
308000.	1.7528153E-09	1.4388925E 03	1.8570500E 03	3.2881401E-11	5.9304712E-05	8.6388681E 02
310000.	1.6953204E-09	1.4405061E 03	1.8636500E 03	3.1690368E-11	5.9421913E-05	8.6542059E 02
312000.	1.6399340E-09	1.4420949E 03	1.8702500E 03	3.0547084E-11	5.9538689E-05	8.6695164E 02
314000.	1.5866056E-09	1.4436690E 03	1.8768500E 03	2.9454550E-11	5.9655355E-05	8.6848003E 02
316000.	1.5352017E-09	1.4451982E 03	1.8834500E 03	2.8395473E-11	5.9771778E-05	8.7000570E 02
318000.	1.4856637E-09	1.4467126E 03	1.8900500E 03	2.7383248E-11	5.9887992E-05	8.7152870E 02
320000.	1.4379174E-09	1.4482023E 03	1.8966500E 03	2.6410980E-11	6.0003988E-05	8.7304906E 02
322000.	1.3918915E-09	1.4496672E 03	1.9032500E 03	2.5476943E-11	6.0119747E-05	8.7456476E 02
324000.	1.3475168E-09	1.4511072E 03	1.9098500E 03	2.4579480E-11	6.0235330E-05	8.7607685E 02
326000.	1.3047288E-09	1.4525225E 03	1.9164500E 03	2.3717042E-11	6.0350677E-05	8.7758436E 02
328000.	1.2634642E-09	1.4539130E 03	1.9230500E 03	2.2888120E-11	6.0465811E-05	8.7909416E 02
330000.	1.2236637E-09	1.4552787E 03	1.9296500E 03	2.2091301E-11	6.0580732E-05	8.8061143E 02
332000.	1.1852696E-09	1.4566196E 03	1.9362500E 03	2.1325217E-11	6.0695443E-05	8.8212613E 02
334000.	1.1482273E-09	1.4579357E 03	1.9428500E 03	2.0588579E-11	6.0809942E-05	8.8363827E 02
336000.	1.1124816E-09	1.4592270E 03	1.9494500E 03	1.9880142E-11	6.0924233E-05	8.8514784E 02
338000.	1.0779898E-09	1.4604935E 03	1.9560500E 03	1.9198728E-11	6.1038315E-05	8.8664916E 02
340000.	1.0446960E-09	1.4617353E 03	1.9626500E 03	1.8543206E-11	6.1152192E-05	8.8814992E 02
342000.	1.0125367E-09	1.4629522E 03	1.9692500E 03	1.7912503E-11	6.1265862E-05	8.8964143E 02
344000.	9.8152788E-10	1.4641444E 03	1.9758500E 03	1.7305591E-11	6.1379327E-05	8.9112093E 02
346000.	9.5326966E-10	1.4653117E 03	1.9824500E 03	1.6721486E-11	6.1492588E-05	8.9257798E 02
348000.	9.263318E-10	1.4664543E 03	1.9890500E 03	1.6159247E-11	6.1605647E-05	8.9402533E 02
350000.	8.9968797E-10	1.4675721E 03	1.9956500E 03	1.5617984E-11	6.1718505E-05	8.9546464E 02
352000.	8.7669385E-10	1.4686650E 03	2.0022500E 03	1.5096837E-11	6.1831163E-05	8.9689429E 02
354000.	8.4616112E-10	1.4697332E 03	2.0088500E 03	1.4594989E-11	6.1943621E-05	8.9831502E 02
356000.	8.1641749E-10	1.4707766E 03	2.0154500E 03	1.4111658E-11	6.2055860E-05	8.9972628E 02
358000.	7.8820677E-10	1.4717932E 03	2.0220500E 03	1.3646089E-11	6.2167941E-05	9.0113486E 02
360000.	7.6093477E-10	1.4727891E 03	2.0286500E 03	1.3197576E-11	6.2279806E-05	9.0253862E 02
362000.	7.3478808E-10	1.4737581E 03	2.0352500E 03	1.2765429E-11	6.2391479E-05	9.0393820E 02
364000.	7.0979869E-10	1.4747023E 03	2.0418500E 03	1.2348998E-11	6.2502956E-05	9.0533422E 02
366000.	6.8593609E-10	1.4756217E 03	2.0484500E 03	1.1947634E-11	6.2614258E-05	9.0671425E 02
368000.	6.6328121E-10	1.4765165E 03	2.0550500E 03	1.1560797E-11	6.2725388E-05	9.0807743E 02
370000.	6.4180577E-10	1.4773863E 03	2.0616500E 03	1.1187894E-11	6.2836227E-05	9.0942368E 02
372000.	6.2148725E-10	1.4782313E 03	2.0682500E 03	1.0828284E-11	6.2946938E-05	9.1076296E 02
374000.	6.0227294E-10	1.4790516E 03	2.0748500E 03	1.0481951E-11	6.3057459E-05	9.1209427E 02
376000.	5.8417922E-10	1.4798471E 03	2.0814500E 03	1.0147159E-11	6.3167787E-05	9.1341827E 02
378000.	5.6720695E-10	1.4806177E 03	2.0880500E 03	9.8246243E-12	6.3277930E-05	9.1473539E 02
380000.	5.5134673E-10	1.4813637E 03	2.0946500E 03	9.5134673E-12	6.3387887E-05	9.1604893E 02
382000.	5.3657192E-10	1.4820948E 03	2.1012500E 03	9.2133057E-12	6.3497637E-05	9.1735931E 02
384000.	5.22846391E-10	1.4828111E 03	2.1078500E 03	8.9236559E-12	6.3607243E-05	9.1866710E 02
386000.	5.0987570E-10	1.4835126E 03	2.1144500E 03	8.6441346E-12	6.3716648E-05	9.1997297E 02
388000.	4.9755236E-10	1.4841993E 03	2.1210500E 03	8.3743910E-12	6.3825865E-05	9.2127622E 02
390000.	4.8582536E-10	1.4848713E 03	2.1276500E 03	8.1129144E-12	6.3934902E-05	9.2257733E 02
392000.	4.7469243E-10	1.4855284E 03	2.1342500E 03	7.8625296E-12	6.4043758E-05	9.2387601E 02
394000.	4.64052657E-10	1.4861808E 03	2.1408500E 03	7.6197901E-12	6.4152434E-05	9.2517219E 02
396000.	4.5389939E-10	1.4868283E 03	2.1474500E 03	7.3893930E-12	6.4260931E-05	9.2646606E 02
398000.	4.4424612E-10	1.4874711E 03	2.1540500E 03	7.1699199E-12	6.4369250E-05	9.2775834E 02
400000.	4.3509664E-10	1.4881091E 03	2.1606500E 03	6.9603720E-12	6.4477308E-05	9.2904923E 02
402000.	4.2635271E-10	1.4887423E 03	2.1672500E 03	6.7622602E-12	6.4585167E-05	9.3033888E 02
404000.	4.18012851E-10	1.4893708E 03	2.1738500E 03	6.5732014E-12	6.4692845E-05	9.3162716E 02
406000.	4.0997224E-10	1.4899944E 03	2.1804500E 03	6.3928257E-12	6.4799323E-05	9.3291410E 02
408000.	4.0223249E-10	1.4906131E 03	2.1870500E 03	6.2213479E-12	6.4904601E-05	9.3419973E 02
410000.	3.94771792E-10	1.4912264E 03	2.1936500E 03	6.0582436E-12	6.5008680E-05	9.3548408E 02
412000.	3.8758022E-10	1.4918352E 03	2.2002500E 03	5.9039047E-12	6.5111567E-05	9.3676716E 02
414000.	3.8065727E-10	1.4924394E 03	2.2068500E 03	5.7578206E-12	6.5213252E-05	9.3804908E 02
416000.	3.7399181E-10	1.4930390E 03	2.2134500E 03	5.6194704E-12	6.5313735E-05	9.3932986E 02
418000.	3.6758299E-10	1.4936339E 03	2.2200500E 03	5.4892408E-12	6.5413017E-05	9.4060950E 02
420000.	3.6143092E-10	1.4942241E 03	2.2266500E 03	5.3676200E-12	6.5511100E-05	9.4188800E 02
422000.	3.5553552E-10	1.4948096E 03	2.2332500E 03	5.2549900E-12	6.5608083E-05	9.4316536E 02
424000.	3.4989697E-10	1.4953904E 03	2.2398500E 03	5.1518703E-12	6.5703966E-05	9.4444160E 02
426000.	3.4451522E-10	1.4959664E 03	2.2464500E 03	5.0578503E-12	6.5798749E-05	9.4571674E 02
428000.	3.3939127E-10	1.4965376E 03	2.2530500E 03	4.9725206E-12	6.5892432E-05	9.4699080E 02
430000.	3.3452502E-10	1.4971040E 03	2.2596500E 03	4.8954704E-12	6.5985015E-05	9.4826386E 02
432000.	3.2991657E-10	1.4976656E 03	2.2662500E 03	4.8263000E-12	6.6076500E-05	9.4953592E 02
434000.	3.2556592E-10	1.4982224E 03	2.2728500E 03	4.7647000E-12	6.6166887E-05	9.5080700E 02
436000.	3.2147317E-10	1.4987744E 03	2.2794500E 03	4.7092500E-12	6.6256177E-05	9.5207810E 02
438000.	3.1763842E-10	1.4993216E 03	2.2860500E 03	4.6594500E-12	6.6344370E-05	9.5334920E 02

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
300000.	1.9721751E-10	3.2249259E-11	3.2145488E 00	2.2460000E 01	1.0170147E 01	
302000.	1.9645230E-10	3.1062085E-11	3.2209946E 00	2.2403600E 01	1.0170147E 01	
304000.	1.8431249E-10	2.9923249E-11	3.2274314E 00	2.2551200E 01	1.0170147E 01	
306000.	1.7821795E-10	2.8830599E-11	3.2338541E 00	2.2494800E 01	1.0170147E 01	
308000.	1.7234906E-10	2.7782089E-11	3.2402644E 00	2.2442400E 01	1.0170147E 01	
310000.	1.6669656E-10	2.6775764E-11	3.2466625E 00	2.2388000E 01	1.0170147E 01	
312000.	1.6125175E-10	2.5809783E-11	3.2530483E 00	2.2333600E 01	1.0170147E 01	
314000.	1.5600616E-10	2.4882371E-11	3.2584221E 00	2.2279200E 01	1.0170147E 01	
316000.	1.5095177E-10	2.3991847E-11	3.2657837E 00	2.2224800E 01	1.0170147E 01	
318000.	1.4604094E-10	2.3136601E-11	3.2721334E 00	2.2170400E 01	1.0170147E 01	
320000.	1.4138610E-10	2.2315113E-11	3.2784711E 00	2.2116000E 01	1.0170147E 01	
322000.	1.3686051E-10	2.1525929E-11	3.2847970E 00	2.2061600E 01	1.0170147E 01	
324000.	1.3249728E-10	2.0767656E-11	3.2911111E 00	2.2007200E 01	1.0170147E 01	
326000.	1.2829006E-10	2.0038957E-11	3.2974133E 00	2.1952800E 01	1.0170147E 01	
328000.	1.2423264E-10	1.9330586E-11	3.3037040E 00	2.1898400E 01	1.0170147E 01	
330000.	1.2031917E-10	1.8645339E-11	3.3099830E 00	2.1844000E 01	1.0170147E 01	
332000.	1.1653995E-10	1.8010061E-11	3.3162505E 00	2.1789600E 01	1.0170147E 01	
334000.	1.1290174E-10	1.7395662E-11	3.3225065E 00	2.1735200E 01	1.0170147E 01	
336000.	1.0938722E-10	1.6797091E-11	3.3287511E 00	2.1680800E 01	1.0170147E 01	
338000.	1.0599549E-10	1.6227351E-11	3.3349842E 00	2.1626400E 01	1.0170147E 01	
340000.	1.0272181E-10	1.5667489E-11	3.3412062E 00	2.1572000E 01	1.0170147E 01	
342000.	9.9561659E-11	1.5134597E-11	3.3474168E 00	2.1517600E 01	1.0170147E 01	
344000.	9.6510686E-11	1.4621806E-11	3.3536163E 00	2.1463200E 01	1.0170147E 01	
346000.	9.3564718E-11	1.4128285E-11	3.3598054E 00	2.1408800E 01	1.0170147E 01	
348000.	9.0719748E-11	1.3653240E-11	3.3659819E 00	2.1354400E 01	1.0170147E 01	
350000.	8.7971979E-11	1.3195917E-11	3.3721481E 00	2.1300000E 01	1.0170147E 01	
352000.	8.5317729E-11	1.2755590E-11	3.3783035E 00	2.1245600E 01	1.0170147E 01	
354000.	8.2753484E-11	1.2331570E-11	3.3844479E 00	2.1191200E 01	1.0170147E 01	
356000.	8.0275078E-11	1.1923194E-11	3.3905815E 00	2.1136800E 01	1.0170147E 01	
358000.	7.7881643E-11	1.1529827E-11	3.3967043E 00	2.1082400E 01	1.0170147E 01	
360000.	7.5567713E-11	1.1150870E-11	3.4028164E 00	2.1028000E 01	1.0170147E 01	
362000.	7.3331100E-11	1.0785742E-11	3.4089178E 00	2.0973600E 01	1.0170147E 01	
364000.	7.1168949E-11	1.0433891E-11	3.4150086E 00	2.0919200E 01	1.0170147E 01	
366000.	6.9078517E-11	1.0094788E-11	3.4210888E 00	2.0864800E 01	1.0170147E 01	
368000.	6.7057161E-11	9.7679259E-12	3.4271585E 00	2.0810400E 01	1.0170147E 01	
370000.	6.5102358E-11	9.4528193E-12	3.4332178E 00	2.0756000E 01	1.0170147E 01	
372000.	6.3211727E-11	9.1490122E-12	3.4392665E 00	2.0701600E 01	1.0170147E 01	
374000.	6.1382881E-11	8.8560518E-12	3.4453051E 00	2.0647200E 01	1.0170147E 01	
376000.	5.9613612E-11	8.5735176E-12	3.4513333E 00	2.0592800E 01	1.0170147E 01	
378000.	5.7901772E-11	8.3010025E-12	3.4573513E 00	2.0538400E 01	1.0170147E 01	
380000.	5.6245297E-11	8.0381171E-12	3.4633591E 00	2.0484000E 01	1.0170147E 01	
382000.	5.4642204E-11	7.7844842E-12	3.4693566E 00	2.0429600E 01	1.0170147E 01	
384000.	5.3090586E-11	7.5397579E-12	3.4753442E 00	2.0375200E 01	1.0170147E 01	
386000.	5.1588625E-11	7.3035854E-12	3.4813217E 00	2.0320800E 01	1.0170147E 01	
388000.	5.0134544E-11	7.0756403E-12	3.4872891E 00	2.0266400E 01	1.0170147E 01	
390000.	4.8726665E-11	6.8556094E-12	3.4932467E 00	2.0212000E 01	1.0170147E 01	
392000.	4.7363369E-11	6.6431931E-12	3.4991943E 00	2.0157600E 01	1.0170147E 01	
394000.	4.6043067E-11	6.4380981E-12	3.5051321E 00	2.0103200E 01	1.0170147E 01	
396000.	4.4764287E-11	6.2400517E-12	3.5110601E 00	2.0048800E 01	1.0170147E 01	
398000.	4.3525258E-11	6.0497851E-12	3.5169784E 00	1.9994400E 01	1.0170147E 01	
400000.	4.2325508E-11	5.8640454E-12	3.5228868E 00	1.9940000E 01	1.0170147E 01	
402000.	4.1160929E-11	5.6899058E-12	3.5275352E 00	1.9900000E 01	1.0170147E 01	
404000.	4.0031723E-11	5.5196818E-12	3.5321777E 00	1.9860000E 01	1.0170147E 01	
406000.	3.8936727E-11	5.3558727E-12	3.5368142E 00	1.9820000E 01	1.0170147E 01	
408000.	3.7874815E-11	5.1973845E-12	3.5414447E 00	1.9780000E 01	1.0170147E 01	
410000.	3.6844887E-11	5.0440286E-12	3.5460694E 00	1.9740000E 01	1.0170147E 01	
412000.	3.5845914E-11	4.8956280E-12	3.5506881E 00	1.9700000E 01	1.0170147E 01	
414000.	3.4876853E-11	4.7520055E-12	3.5553010E 00	1.9660000E 01	1.0170147E 01	
416000.	3.3936757E-11	4.6129984E-12	3.5599080E 00	1.9620000E 01	1.0170147E 01	
418000.	3.3024653E-11	4.4784423E-12	3.5645092E 00	1.9580000E 01	1.0170147E 01	
420000.	3.2139654E-11	4.3481855E-12	3.5691047E 00	1.9540000E 01	1.0170147E 01	
422000.	3.1280870E-11	4.2220779E-12	3.5736942E 00	1.9500000E 01	1.0170147E 01	
424000.	3.0447457E-11	4.0999767E-12	3.5782783E 00	1.9460000E 01	1.0170147E 01	
426000.	2.9638602E-11	3.9817445E-12	3.5828564E 00	1.9420000E 01	1.0170147E 01	
428000.	2.8853498E-11	3.8672462E-12	3.5874288E 00	1.9380000E 01	1.0170147E 01	
430000.	2.8091408E-11	3.7563572E-12	3.5919957E 00	1.9340000E 01	1.0170147E 01	
432000.	2.7351578E-11	3.6489520E-12	3.5965567E 00	1.9300000E 01	1.0170147E 01	
434000.	2.6633309E-11	3.5449132E-12	3.6011122E 00	1.9260000E 01	1.0170147E 01	
436000.	2.5935906E-11	3.4441252E-12	3.6056620E 00	1.9220000E 01	1.0170147E 01	
438000.	2.5258710E-11	3.3464783E-12	3.6102062E 00	1.9180000E 01	1.0170147E 01	

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	MOLECULAR TEMPERATURE	DENSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons/cm <sup>2</sup>	degrees K	degrees K	kg/m <sup>3</sup>	newton-sec/m <sup>2</sup>	m/sec
440000.	2.5517604E-10	1.4965061E-03	2.2646500E-03	3.8487362E-12	6.6158612E-05	9.5399390E-02
442000.	2.4371127E-10	1.4968076E-03	2.2698500E-03	3.7402308E-12	6.6241579E-05	9.5508853E-02
444000.	2.3734258E-10	1.4970946E-03	2.2750500E-03	3.6350738E-12	6.6324444E-05	9.5618191E-02
446000.	2.3126473E-10	1.4973676E-03	2.2802500E-03	3.5331714E-12	6.6407207E-05	9.5727403E-02
448000.	2.2531199E-10	1.4976261E-03	2.2854500E-03	3.4343957E-12	6.6489869E-05	9.5836493E-02
450000.	2.1952890E-10	1.4978702E-03	2.2906500E-03	3.3386486E-12	6.6572431E-05	9.5945457E-02
452000.	2.1391231E-10	1.4980998E-03	2.2958500E-03	3.2458315E-12	6.6654892E-05	9.6054298E-02
454000.	2.0845093E-10	1.4933152E-03	2.3010500E-03	3.1558441E-12	6.6737255E-05	9.6163017E-02
456000.	2.0314599E-10	1.4985162E-03	2.3062500E-03	3.0685954E-12	6.6819517E-05	9.6271610E-02
458000.	1.9799363E-10	1.4987299E-03	2.3114500E-03	2.9839931E-12	6.6901681E-05	9.6380085E-02
460000.	1.9298021E-10	1.4988752E-03	2.3166500E-03	2.9019512E-12	6.6983746E-05	9.6488435E-02
462000.	1.8812034E-10	1.4990331E-03	2.3218500E-03	2.8223851E-12	6.7065712E-05	9.6596664E-02
464000.	1.8337669E-10	1.4991767E-03	2.3270500E-03	2.7452138E-12	6.7147580E-05	9.6704772E-02
466000.	1.7877516E-10	1.4993058E-03	2.3322500E-03	2.6703602E-12	6.7229351E-05	9.6812760E-02
468000.	1.7430157E-10	1.4994207E-03	2.3374500E-03	2.5977463E-12	6.7311026E-05	9.6920626E-02
470000.	1.6995216E-10	1.4995212E-03	2.3426500E-03	2.5273014E-12	6.7392603E-05	9.7028372E-02
472000.	1.6572313E-10	1.4996073E-03	2.3478500E-03	2.4589548E-12	6.7474083E-05	9.7136002E-02
474000.	1.6161382E-10	1.4996790E-03	2.3530500E-03	2.3926382E-12	6.7555466E-05	9.7243512E-02
476000.	1.5761171E-10	1.4997363E-03	2.3582500E-03	2.3282864E-12	6.7636753E-05	9.7350900E-02
478000.	1.5372238E-10	1.4997794E-03	2.3634500E-03	2.2658358E-12	6.7717947E-05	9.7458172E-02
480000.	1.4993956E-10	1.4998080E-03	2.3686500E-03	2.2052260E-12	6.7799044E-05	9.7565325E-02
482000.	1.4626306E-10	1.4998233E-03	2.3738500E-03	2.1463978E-12	6.7880046E-05	9.7672361E-02
484000.	1.4268077E-10	1.4998223E-03	2.3790500E-03	2.0892944E-12	6.7960953E-05	9.7779280E-02
486000.	1.3919874E-10	1.4998078E-03	2.3842500E-03	2.0338610E-12	6.8041767E-05	9.7886081E-02
488000.	1.3581101E-10	1.4997790E-03	2.3894500E-03	1.9800438E-12	6.8122485E-05	9.7992767E-02
490000.	1.3251486E-10	1.4997359E-03	2.3946500E-03	1.9277925E-12	6.8203111E-05	9.8099338E-02
492000.	1.2930755E-10	1.4996784E-03	2.3998500E-03	1.8770573E-12	6.8283644E-05	9.8205791E-02
494000.	1.2618645E-10	1.4996065E-03	2.4050500E-03	1.8277902E-12	6.8364083E-05	9.8312130E-02
496000.	1.2314902E-10	1.4995202E-03	2.4102500E-03	1.7799451E-12	6.8444428E-05	9.8418353E-02
498000.	1.2019283E-10	1.4994196E-03	2.4154500E-03	1.7334778E-12	6.8524683E-05	9.8524462E-02
500000.	1.1731545E-10	1.4993047E-03	2.4206500E-03	1.6883441E-12	6.8604845E-05	9.8630458E-02
502000.	1.1451121E-10	1.4995694E-03	2.4258500E-03	1.6456754E-12	6.8685720E-05	9.8736970E-02
504000.	1.1177938E-10	1.4998289E-03	2.4274500E-03	1.6041654E-12	6.8769534E-05	9.8843895E-02
506000.	1.0911792E-10	1.5000833E-03	2.4308500E-03	1.5637801E-12	6.8856180E-05	9.8950713E-02
508000.	1.0652497E-10	1.5003325E-03	2.4342500E-03	1.5244890E-12	6.8944067E-05	9.9057138E-02
510000.	1.0399854E-10	1.5005765E-03	2.4376500E-03	1.4862561E-12	6.9032000E-05	9.9163088E-02
512000.	1.0153685E-10	1.5008154E-03	2.4410500E-03	1.4490546E-12	6.9120000E-05	9.9268519E-02
514000.	9.9138159E-11	1.5010591E-03	2.4444500E-03	1.4128544E-12	6.9207975E-05	9.9373438E-02
516000.	9.6800666E-11	1.5012776E-03	2.4478500E-03	1.3776259E-12	6.9295876E-05	9.9477848E-02
518000.	9.4522758E-11	1.5015010E-03	2.4512500E-03	1.3433418E-12	6.9383719E-05	9.9581794E-02
520000.	9.2302788E-11	1.5017193E-03	2.4546500E-03	1.3099750E-12	6.9471471E-05	9.9685214E-02
522000.	9.0139147E-11	1.5019323E-03	2.4580500E-03	1.2774988E-12	6.9559171E-05	9.9788177E-02
524000.	8.8032357E-11	1.5021402E-03	2.4614500E-03	1.2458886E-12	6.9646849E-05	9.9890691E-02
526000.	8.5974921E-11	1.5023429E-03	2.4648500E-03	1.2151197E-12	6.9734410E-05	9.9992758E-02
528000.	8.3971362E-11	1.5025405E-03	2.4682500E-03	1.1851677E-12	6.9821971E-05	1.0004379E-01
530000.	8.2018286E-11	1.5027328E-03	2.4716499E-03	1.1560097E-12	6.9909534E-05	1.0015950E-01
532000.	8.0114324E-11	1.5029201E-03	2.4750500E-03	1.1276231E-12	6.9997097E-05	1.0027477E-01
534000.	7.8258179E-11	1.5031021E-03	2.4784500E-03	1.0999864E-12	6.9984660E-05	1.0038955E-01
536000.	7.6448556E-11	1.5032790E-03	2.4818500E-03	1.0730785E-12	6.9972223E-05	1.0050386E-01
538000.	7.4688481E-11	1.5034507E-03	2.4852500E-03	1.0468785E-12	6.9959781E-05	1.0061771E-01
540000.	7.2963864E-11	1.5036173E-03	2.4886500E-03	1.0213668E-12	6.9947347E-05	1.0073114E-01
542000.	7.1286404E-11	1.5037787E-03	2.4920500E-03	9.9652387E-13	6.9934918E-05	1.0084415E-01
544000.	6.9650681E-11	1.5039350E-03	2.4954500E-03	9.7233125E-13	6.9922494E-05	1.0095674E-01
546000.	6.8055573E-11	1.5040860E-03	2.4988500E-03	9.4877069E-13	6.9910075E-05	1.0106891E-01
548000.	6.6500008E-11	1.5042319E-03	2.5022500E-03	9.2582468E-13	6.9897651E-05	1.0118068E-01
550000.	6.4982911E-11	1.5043727E-03	2.5056500E-03	9.0347577E-13	6.9885239E-05	1.0129206E-01
552000.	6.3503272E-11	1.5045083E-03	2.5090500E-03	8.8170750E-13	6.9872827E-05	1.0140303E-01
554000.	6.2063105E-11	1.5046387E-03	2.5124500E-03	8.6050388E-13	6.9860415E-05	1.0151360E-01
556000.	6.0652455E-11	1.5047639E-03	2.5158500E-03	8.3984936E-13	6.9847999E-05	1.0162377E-01
558000.	5.9279361E-11	1.5048840E-03	2.5192500E-03	8.1972843E-13	6.9835587E-05	1.0173353E-01
560000.	5.7939934E-11	1.5049989E-03	2.5226499E-03	8.0012667E-13	6.9823179E-05	1.0184290E-01
562000.	5.6633257E-11	1.5051087E-03	2.5260500E-03	7.8102934E-13	6.9810776E-05	1.0195187E-01
564000.	5.5358504E-11	1.5052133E-03	2.5294500E-03	7.6242301E-13	6.9798378E-05	1.0206044E-01
566000.	5.4114844E-11	1.5053127E-03	2.5328500E-03	7.4429430E-13	6.9785985E-05	1.0216861E-01
568000.	5.2901437E-11	1.5054069E-03	2.5362500E-03	7.2662964E-13	6.9773597E-05	1.0227638E-01
570000.	5.1717495E-11	1.5054967E-03	2.5396500E-03	7.0941664E-13	6.9761214E-05	1.0238375E-01
572000.	5.0562249E-11	1.5055803E-03	2.5430500E-03	6.9264256E-13	6.9748836E-05	1.0249072E-01
574000.	4.9434971E-11	1.5056587E-03	2.5464500E-03	6.7629619E-13	6.9736463E-05	1.0259729E-01
576000.	4.8334925E-11	1.5057323E-03	2.5498500E-03	6.6036518E-13	6.9724095E-05	1.0270346E-01
578000.	4.7261423E-11	1.5058008E-03	2.5532500E-03	6.4483888E-13	6.9711732E-05	1.0280923E-01

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
440000.	2.4601083E-11	3.2518666E-12	3.6147448E 00	1.9140000E 01	1.0170147E 01	
442000.	2.3962413E-11	3.1601885E-12	3.6192779E 00	1.9100000E 01	1.0170147E 01	
444000.	2.3322098E-11	3.0713555E-12	3.6238055E 00	1.9060000E 01	1.0170147E 01	
446000.	2.2739566E-11	2.9852403E-12	3.6283273E 00	1.9020000E 01	1.0170147E 01	
448000.	2.2154250E-11	2.9017829E-12	3.6328430E 00	1.8980000E 01	1.0170147E 01	
450000.	2.1585616E-11	2.8208845E-12	3.6373540E 00	1.8940000E 01	1.0170147E 01	
452000.	2.1033137E-11	2.7424616E-12	3.6418602E 00	1.8900000E 01	1.0170147E 01	
454000.	2.0496333E-11	2.6664296E-12	3.6463604E 00	1.8860000E 01	1.0170147E 01	
456000.	1.9974735E-11	2.5927117E-12	3.6508549E 00	1.8820000E 01	1.0170147E 01	
458000.	1.9467820E-11	2.5212297E-12	3.6553442E 00	1.8780000E 01	1.0170147E 01	
460000.	1.8975164E-11	2.4519109E-12	3.6598280E 00	1.8740000E 01	1.0170147E 01	
462000.	1.8496324E-11	2.3846841E-12	3.6643064E 00	1.8700000E 01	1.0170147E 01	
464000.	1.8030879E-11	2.3194807E-12	3.6687796E 00	1.8660000E 01	1.0170147E 01	
466000.	1.7578424E-11	2.2562355E-12	3.6732473E 00	1.8620000E 01	1.0170147E 01	
468000.	1.7138550E-11	2.1948827E-12	3.6777098E 00	1.8580000E 01	1.0170147E 01	
470000.	1.6710885E-11	2.1353625E-12	3.6821670E 00	1.8540000E 01	1.0170147E 01	
472000.	1.6295057E-11	2.0776153E-12	3.6866188E 00	1.8500000E 01	1.0170147E 01	
474000.	1.5890706E-11	2.0215832E-12	3.6910654E 00	1.8460000E 01	1.0170147E 01	
476000.	1.5497486E-11	1.9672112E-12	3.6955048E 00	1.8420000E 01	1.0170147E 01	
478000.	1.5115059E-11	1.9144455E-12	3.6999429E 00	1.8380000E 01	1.0170147E 01	
480000.	1.4743106E-11	1.8632352E-12	3.7043739E 00	1.8340000E 01	1.0170147E 01	
482000.	1.4381312E-11	1.8135303E-12	3.7087997E 00	1.8300000E 01	1.0170147E 01	
484000.	1.4029371E-11	1.7652825E-12	3.7132202E 00	1.8260000E 01	1.0170147E 01	
486000.	1.3686994E-11	1.7184459E-12	3.7176357E 00	1.8220000E 01	1.0170147E 01	
488000.	1.3353888E-11	1.6729747E-12	3.7220460E 00	1.8180000E 01	1.0170147E 01	
490000.	1.3029787E-11	1.6288266E-12	3.7264512E 00	1.8140000E 01	1.0170147E 01	
492000.	1.2714423E-11	1.5859596E-12	3.7308513E 00	1.8100000E 01	1.0170147E 01	
494000.	1.2407534E-11	1.5443330E-12	3.7352462E 00	1.8060000E 01	1.0170147E 01	
496000.	1.2108872E-11	1.5039077E-12	3.7396361E 00	1.8020000E 01	1.0170147E 01	
498000.	1.1818200E-11	1.4646467E-12	3.7440211E 00	1.7980000E 01	1.0170147E 01	
500000.	1.1535275E-11	1.4265124E-12	3.7484009E 00	1.7940000E 01	1.0170147E 01	
502000.	1.1259543E-11	1.3905608E-12	3.7527619E 00	1.7918000E 01	1.0170147E 01	
504000.	1.0990930E-11	1.3553883E-12	3.7571209E 00	1.7896000E 01	1.0170147E 01	
506000.	1.0729237E-11	1.3212660E-12	3.7569776E 00	1.7874000E 01	1.0170147E 01	
508000.	1.0474280E-11	1.2880674E-12	3.7598323E 00	1.7852000E 01	1.0170147E 01	
510000.	1.0225864E-11	1.2557646E-12	3.7626848E 00	1.7830000E 01	1.0170147E 01	
512000.	9.9838128E-12	1.2243324E-12	3.7655352E 00	1.7808000E 01	1.0170147E 01	
514000.	9.7479562E-12	1.1937462E-12	3.7683835E 00	1.7786000E 01	1.0170147E 01	
516000.	9.5181185E-12	1.1639810E-12	3.7712297E 00	1.7764000E 01	1.0170147E 01	
518000.	9.2941386E-12	1.1350137E-12	3.7740737E 00	1.7742000E 01	1.0170147E 01	
520000.	9.0758557E-12	1.1068215E-12	3.7769157E 00	1.7720000E 01	1.0170147E 01	
522000.	8.8631114E-12	1.0793818E-12	3.7797555E 00	1.7698000E 01	1.0170147E 01	
524000.	8.6557805E-12	1.0526737E-12	3.7825933E 00	1.7676000E 01	1.0170147E 01	
526000.	8.4536555E-12	1.0266765E-12	3.7854290E 00	1.7654000E 01	1.0170147E 01	
528000.	8.2566516E-12	1.0013696E-12	3.7882626E 00	1.7632000E 01	1.0170147E 01	
530000.	8.0646114E-12	9.7673345E-13	3.7910941E 00	1.7610000E 01	1.0170147E 01	
532000.	7.8774006E-12	9.5274907E-13	3.7939236E 00	1.7588000E 01	1.0170147E 01	
534000.	7.6948915E-12	9.2939839E-13	3.7967510E 00	1.7566000E 01	1.0170147E 01	
536000.	7.5169567E-12	9.0666342E-13	3.7995763E 00	1.7544000E 01	1.0170147E 01	
538000.	7.3434709E-12	8.8452656E-13	3.8023995E 00	1.7522000E 01	1.0170147E 01	
540000.	7.1743174E-12	8.6297128E-13	3.8052208E 00	1.7500000E 01	1.0170147E 01	
542000.	7.0093778E-12	8.4198101E-13	3.8080399E 00	1.7478000E 01	1.0170147E 01	
544000.	6.8485421E-12	8.2154022E-13	3.8108571E 00	1.7456000E 01	1.0170147E 01	
546000.	6.6916999E-12	8.0163348E-13	3.8136721E 00	1.7434000E 01	1.0170147E 01	
548000.	6.5387459E-12	7.8224598E-13	3.8164851E 00	1.7412000E 01	1.0170147E 01	
550000.	6.3895743E-12	7.6336294E-13	3.8192961E 00	1.7390000E 01	1.0170147E 01	
552000.	6.2440858E-12	7.4497059E-13	3.8221051E 00	1.7368000E 01	1.0170147E 01	
554000.	6.1021836E-12	7.2705526E-13	3.8249120E 00	1.7346000E 01	1.0170147E 01	
556000.	5.9637735E-12	7.0960388E-13	3.8277169E 00	1.7324000E 01	1.0170147E 01	
558000.	5.8287613E-12	6.9260335E-13	3.8305198E 00	1.7302000E 01	1.0170147E 01	
560000.	5.6970595E-12	6.7604147E-13	3.8333207E 00	1.7280000E 01	1.0170147E 01	
562000.	5.5685779E-12	6.5990578E-13	3.8361196E 00	1.7258000E 01	1.0170147E 01	
564000.	5.4432353E-12	6.4418496E-13	3.8389165E 00	1.7236000E 01	1.0170147E 01	
566000.	5.3209499E-12	6.2886768E-13	3.8417113E 00	1.7214000E 01	1.0170147E 01	
568000.	5.2016386E-12	6.1394249E-13	3.8445041E 00	1.7192000E 01	1.0170147E 01	
570000.	5.0852258E-12	5.9939892E-13	3.8472950E 00	1.7170000E 01	1.0170147E 01	
572000.	4.9716340E-12	5.8522629E-13	3.8500840E 00	1.7148000E 01	1.0170147E 01	
574000.	4.8607928E-12	5.7141486E-13	3.8528709E 00	1.7126000E 01	1.0170147E 01	
576000.	4.7526278E-12	5.5795445E-13	3.8556558E 00	1.7104000E 01	1.0170147E 01	
578000.	4.6470737E-12	5.4483600E-13	3.8584388E 00	1.7082000E 01	1.0170147E 01	



# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

GEOMETRIC ALTITUDE	PRESSURE	KINETIC TEMPERATURE	MOLECULAR TEMPERATURE	DENSITY	COEFFICIENT OF VISCOSITY	SPEED OF SOUND
meters	newtons cm <sup>-2</sup>	degrees K	degrees K	kg m <sup>-3</sup>	newton-sec m <sup>-2</sup>	m sec <sup>-1</sup>
580000.	4.6213737E-11	1.5058640E 03	2.5586500E 03	6.2970581E-13	7.0669703E-05	1.136329E 03
582000.	4.5191225E-11	1.5059221E 03	2.5600500E 03	6.1495511E-13	7.0720567E-05	1.0143067E 03
584000.	4.4193244E-11	1.5059751E 03	2.5634500E 03	6.0057713E-13	7.0771394E-05	1.0149800E 03
586000.	4.3219147E-11	1.5060228E 03	2.5668500E 03	5.8656136E-13	7.0822185E-05	1.0156529E 03
588000.	4.2268324E-11	1.5060654E 03	2.5702500E 03	5.7289814E-13	7.0872940E-05	1.0163253E 03
590000.	4.1349184E-11	1.5061029E 03	2.5736500E 03	5.5957806E-13	7.0923660E-05	1.0169973E 03
592000.	4.0434149E-11	1.5061352E 03	2.5770500E 03	5.4659193E-13	7.0974344E-05	1.0176688E 03
594000.	3.9549641E-11	1.5061623E 03	2.5804500E 03	5.3393065E-13	7.1024992E-05	1.0183399E 03
596000.	3.8686114E-11	1.5061842E 03	2.5838500E 03	5.2158557E-13	7.1075606E-05	1.0190106E 03
598000.	3.7843038E-11	1.5062010E 03	2.5872500E 03	5.0954831E-13	7.1126181E-05	1.0196808E 03
600000.	3.7019889E-11	1.5062126E 03	2.5906500E 03	4.9781058E-13	7.1176726E-05	1.0203506E 03
602000.	3.6215577E-11	1.5062291E 03	2.5928500E 03	4.8658169E-13	7.1229410E-05	1.0207837E 03
604000.	3.5429846E-11	1.5063697E 03	2.5950500E 03	4.7562129E-13	7.1284208E-05	1.0212167E 03
606000.	3.4662245E-11	1.5064451E 03	2.5972500E 03	4.6492264E-13	7.1342436E-05	1.0216495E 03
608000.	3.3912334E-11	1.5065186E 03	2.5994500E 03	4.5447915E-13	7.1403737E-05	1.0220821E 03
610000.	3.3179683E-11	1.5065899E 03	2.6016500E 03	4.4428445E-13	7.1468003E-05	1.0225145E 03
612000.	3.2463859E-11	1.5066593E 03	2.6038500E 03	4.3433210E-13	7.1537215E-05	1.0229468E 03
614000.	3.1764455E-11	1.5067267E 03	2.6060500E 03	4.2461606E-13	7.1610521E-05	1.0233788E 03
616000.	3.1081098E-11	1.5067919E 03	2.6082500E 03	4.1513073E-13	7.1687795E-05	1.0238107E 03
618000.	3.0413369E-11	1.5068552E 03	2.6104500E 03	4.0586995E-13	7.1769181E-05	1.0242424E 03
620000.	2.9760908E-11	1.5069164E 03	2.6126499E 03	3.9682836E-13	7.1852915E-05	1.0246739E 03
622000.	2.9123341E-11	1.5069756E 03	2.6148500E 03	3.8800040E-13	7.1935454E-05	1.0251052E 03
624000.	2.8500294E-11	1.5070327E 03	2.6170500E 03	3.7938056E-13	7.1567978E-05	1.0255363E 03
626000.	2.7891442E-11	1.5070878E 03	2.6192500E 03	3.7096440E-13	7.1600487E-05	1.0259673E 03
628000.	2.7296429E-11	1.5071409E 03	2.6214500E 03	3.6274548E-13	7.1632982E-05	1.0263981E 03
630000.	2.6714925E-11	1.5071919E 03	2.6236500E 03	3.5472012E-13	7.1665463E-05	1.0268287E 03
632000.	2.6146607E-11	1.5072410E 03	2.6258500E 03	3.4688313E-13	7.1697928E-05	1.0272591E 03
634000.	2.5591154E-11	1.5072879E 03	2.6280500E 03	3.3922980E-13	7.1730380E-05	1.0276894E 03
636000.	2.5048265E-11	1.5073328E 03	2.6302500E 03	3.3175568E-13	7.1762818E-05	1.0281194E 03
638000.	2.4517629E-11	1.5073758E 03	2.6324500E 03	3.2445621E-13	7.1795239E-05	1.0285493E 03
640000.	2.3998967E-11	1.5074166E 03	2.6346500E 03	3.1732726E-13	7.1827648E-05	1.0289790E 03
642000.	2.3491983E-11	1.5074555E 03	2.6368500E 03	3.1036448E-13	7.1860043E-05	1.0294085E 03
644000.	2.2996400E-11	1.5074923E 03	2.6390500E 03	3.0356381E-13	7.1892422E-05	1.0298379E 03
646000.	2.2511953E-11	1.5075270E 03	2.6412500E 03	2.9692135E-13	7.1924787E-05	1.0302670E 03
648000.	2.2038369E-11	1.5075597E 03	2.6434500E 03	2.9043309E-13	7.1957139E-05	1.0306960E 03
650000.	2.1575395E-11	1.5075904E 03	2.6456500E 03	2.8409535E-13	7.1989475E-05	1.0311248E 03
652000.	2.1122777E-11	1.5076191E 03	2.6478500E 03	2.7790439E-13	7.2021797E-05	1.0315534E 03
654000.	2.0680276E-11	1.5076457E 03	2.6500500E 03	2.7185668E-13	7.2054106E-05	1.0319819E 03
656000.	2.0247647E-11	1.5076703E 03	2.6522500E 03	2.6594870E-13	7.2086399E-05	1.0324102E 03
658000.	1.9824656E-11	1.5076928E 03	2.6544500E 03	2.6017698E-13	7.2118679E-05	1.0328383E 03
660000.	1.9411084E-11	1.5077133E 03	2.6566499E 03	2.5453834E-13	7.2150944E-05	1.0332662E 03
662000.	1.9006698E-11	1.5077318E 03	2.6588500E 03	2.4902938E-13	7.2183195E-05	1.0336939E 03
664000.	1.8611281E-11	1.5077482E 03	2.6610500E 03	2.4364696E-13	7.2215433E-05	1.0341215E 03
666000.	1.8224638E-11	1.5077626E 03	2.6632500E 03	2.3838819E-13	7.2247656E-05	1.0345489E 03
668000.	1.7846547E-11	1.5077750E 03	2.6654500E 03	2.3324987E-13	7.2279864E-05	1.0349761E 03
670000.	1.7476821E-11	1.5077853E 03	2.6676500E 03	2.2822927E-13	7.2312059E-05	1.0354031E 03
672000.	1.7115252E-11	1.5077936E 03	2.6698500E 03	2.2332338E-13	7.2344239E-05	1.0358300E 03
674000.	1.6761651E-11	1.5077999E 03	2.6720500E 03	2.1852944E-13	7.2376407E-05	1.0362567E 03
676000.	1.6415844E-11	1.5078041E 03	2.6742500E 03	2.1384493E-13	7.2408558E-05	1.0366832E 03
678000.	1.6077632E-11	1.5078063E 03	2.6764500E 03	2.0926697E-13	7.2440697E-05	1.0371093E 03
680000.	1.5746857E-11	1.5078064E 03	2.6786500E 03	2.0479326E-13	7.2472821E-05	1.0375357E 03
682000.	1.5423325E-11	1.5078045E 03	2.6808500E 03	2.0042101E-13	7.2504931E-05	1.0379616E 03
684000.	1.5106879E-11	1.5078006E 03	2.6830500E 03	1.9614794E-13	7.2537029E-05	1.0383874E 03
686000.	1.4797364E-11	1.5077946E 03	2.6852500E 03	1.9197178E-13	7.2569111E-05	1.0388131E 03
688000.	1.4494605E-11	1.5077867E 03	2.6874500E 03	1.8789003E-13	7.2601179E-05	1.0392385E 03
690000.	1.4198452E-11	1.5077766E 03	2.6896500E 03	1.8390054E-13	7.2633234E-05	1.0396638E 03
692000.	1.3908750E-11	1.5077646E 03	2.6918500E 03	1.8000104E-13	7.2665275E-05	1.0400889E 03
694000.	1.3625348E-11	1.5077505E 03	2.6940500E 03	1.7618937E-13	7.2697302E-05	1.0405139E 03
696000.	1.3348109E-11	1.5077343E 03	2.6962500E 03	1.7246356E-13	7.2729314E-05	1.0409386E 03
698000.	1.3076882E-11	1.5077162E 03	2.6984500E 03	1.6882143E-13	7.2761313E-05	1.0413632E 03
700000.	1.2811533E-11	1.5076960E 03	2.7006500E 03	1.6526106E-13	7.2793300E-05	1.0417877E 03

# CAPE KENNEDY REFERENCE ATMOSPHERE VERSUS GEOMETRIC ALTITUDE (ANNUAL)

TABLE III  
(Continued)

	GEOMETRIC ALTITUDE	PRESSURE RATIO	DENSITY RATIO	VISCOSITY RATIO	MOLECULAR WEIGHT	PRESSURE DIFFERENCE	
	meters	unitless	unitless	unitless	unitless	newtons cm <sup>-2</sup>	
580000.	4.5440578E-12	5.3204963E-13	3.8612137E 00	1.7060000E 01	1.0170147E 01		
582000.	4.4435173E-12	5.1958667E-13	3.8639988E 00	1.7038000E 01	1.0170147E 01		
584000.	4.3453888E-12	5.0743845E-13	3.8667759E 00	1.7016000E 01	1.0170147E 01		
586000.	4.2496088E-12	4.9559628E-13	3.8695509E 00	1.6994000E 01	1.0170147E 01		
588000.	4.1561172E-12	4.8405197E-13	3.8723241E 00	1.6972000E 01	1.0170147E 01		
590000.	4.0648560E-12	4.7279759E-13	3.8750953E 00	1.6950000E 01	1.0170147E 01		
592000.	3.9757683E-12	4.6182538E-13	3.8778645E 00	1.6928000E 01	1.0170147E 01		
594000.	3.8887973E-12	4.5112764E-13	3.8806318E 00	1.6906000E 01	1.0170147E 01		
596000.	3.8038893E-12	4.4069706E-13	3.8833972E 00	1.6884000E 01	1.0170147E 01		
598000.	3.7209922E-12	4.3052656E-13	3.8861607E 00	1.6862000E 01	1.0170147E 01		
600000.	3.6400543E-12	4.2060913E-13	3.8889222E 00	1.6840000E 01	1.0170147E 01		
602000.	3.5609688E-12	4.1112165E-13	3.8907080E 00	1.6826600E 01	1.0170147E 01		
604000.	3.4837103E-12	4.0186101E-13	3.8924930E 00	1.6813200E 01	1.0170147E 01		
606000.	3.4082344E-12	3.9282153E-13	3.8942772E 00	1.6799800E 01	1.0170147E 01		
608000.	3.3344978E-12	3.8399763E-13	3.8960607E 00	1.6786400E 01	1.0170147E 01		
610000.	3.2624585E-12	3.7538395E-13	3.8978432E 00	1.6773000E 01	1.0170147E 01		
612000.	3.1920736E-12	3.6697503E-13	3.8996251E 00	1.6759600E 01	1.0170147E 01		
614000.	3.1233034E-12	3.5876577E-13	3.9014061E 00	1.6746200E 01	1.0170147E 01		
616000.	3.0561109E-12	3.5075145E-13	3.9031864E 00	1.6732800E 01	1.0170147E 01		
618000.	2.9904551E-12	3.4292684E-13	3.9049657E 00	1.6719400E 01	1.0170147E 01		
620000.	2.9263006E-12	3.3528744E-13	3.9067444E 00	1.6706000E 01	1.0170147E 01		
622000.	2.8636105E-12	3.2782854E-13	3.9085222E 00	1.6692600E 01	1.0170147E 01		
624000.	2.8023482E-12	3.2054548E-13	3.9102992E 00	1.6679199E 01	1.0170147E 01		
626000.	2.7424816E-12	3.1343417E-13	3.9120755E 00	1.6665800E 01	1.0170147E 01		
628000.	2.6839758E-12	3.0649020E-13	3.9138509E 00	1.6652400E 01	1.0170147E 01		
630000.	2.6267982E-12	2.9970942E-13	3.9156256E 00	1.6639000E 01	1.0170147E 01		
632000.	2.5709172E-12	2.9308781E-13	3.9173994E 00	1.6625600E 01	1.0170147E 01		
634000.	2.5163012E-12	2.8662136E-13	3.9191725E 00	1.6612200E 01	1.0170147E 01		
636000.	2.4629205E-12	2.8030636E-13	3.9209448E 00	1.6598800E 01	1.0170147E 01		
638000.	2.4107448E-12	2.7413891E-13	3.9227163E 00	1.6585400E 01	1.0170147E 01		
640000.	2.3597463E-12	2.6811552E-13	3.9244870E 00	1.6572000E 01	1.0170147E 01		
642000.	2.3098961E-12	2.6223255E-13	3.9262570E 00	1.6558600E 01	1.0170147E 01		
644000.	2.2611669E-12	2.5648654E-13	3.9280261E 00	1.6545200E 01	1.0170147E 01		
646000.	2.2135327E-12	2.5087421E-13	3.9297944E 00	1.6531800E 01	1.0170147E 01		
648000.	2.1669666E-12	2.4539216E-13	3.9315620E 00	1.6518400E 01	1.0170147E 01		
650000.	2.1214438E-12	2.4003729E-13	3.9333288E 00	1.6505000E 01	1.0170147E 01		
652000.	2.0769392E-12	2.3480643E-13	3.9350948E 00	1.6491600E 01	1.0170147E 01		
654000.	2.0334294E-12	2.2969662E-13	3.9368601E 00	1.6478200E 01	1.0170147E 01		
656000.	1.9908903E-12	2.2470486E-13	3.9386245E 00	1.6464800E 01	1.0170147E 01		
658000.	1.9492988E-12	2.1982822E-13	3.9403882E 00	1.6451400E 01	1.0170147E 01		
660000.	1.9086335E-12	2.1506403E-13	3.9421511E 00	1.6438000E 01	1.0170147E 01		
662000.	1.8688714E-12	2.1040941E-13	3.9439132E 00	1.6424600E 01	1.0170147E 01		
664000.	1.8299913E-12	2.0586171E-13	3.9456746E 00	1.6411200E 01	1.0170147E 01		
666000.	1.7919739E-12	2.0141848E-13	3.9474352E 00	1.6397800E 01	1.0170147E 01		
668000.	1.7547973E-12	1.9707703E-13	3.9491949E 00	1.6384400E 01	1.0170147E 01		
670000.	1.7184432E-12	1.9283503E-13	3.9509540E 00	1.6371000E 01	1.0170147E 01		
672000.	1.6828913E-12	1.8868995E-13	3.9527123E 00	1.6357600E 01	1.0170147E 01		
674000.	1.6481227E-12	1.8463947E-13	3.9544698E 00	1.6344200E 01	1.0170147E 01		
676000.	1.6141206E-12	1.8068144E-13	3.9562265E 00	1.6330800E 01	1.0170147E 01		
678000.	1.5808652E-12	1.7681344E-13	3.9579825E 00	1.6317400E 01	1.0170147E 01		
680000.	1.5483411E-12	1.7303352E-13	3.9597377E 00	1.6304000E 01	1.0170147E 01		
682000.	1.5165292E-12	1.6933933E-13	3.9614921E 00	1.6290600E 01	1.0170147E 01		
684000.	1.4854145E-12	1.6572893E-13	3.9632458E 00	1.6277200E 01	1.0170147E 01		
686000.	1.4549803E-12	1.6220042E-13	3.9649987E 00	1.6263800E 01	1.0170147E 01		
688000.	1.4252109E-12	1.5875168E-13	3.9667508E 00	1.6250400E 01	1.0170147E 01		
690000.	1.3960912E-12	1.5538089E-13	3.9685022E 00	1.6237000E 01	1.0170147E 01		
692000.	1.3676056E-12	1.5208613E-13	3.9702529E 00	1.6223600E 01	1.0170147E 01		
694000.	1.3397395E-12	1.4886558E-13	3.9720027E 00	1.6210200E 01	1.0170147E 01		
696000.	1.3124794E-12	1.4571757E-13	3.9737518E 00	1.6196800E 01	1.0170147E 01		
698000.	1.2858105E-12	1.4264028E-13	3.9755002E 00	1.6183400E 01	1.0170147E 01		
700000.	1.2597195E-12	1.3963205E-13	3.9772478E 00	1.6170000E 01	1.0170147E 01		

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